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**A MAGAZINE FOR MILITARY VEHICLE ENTHUSIASTS**  
**Volume 5    Number 4**

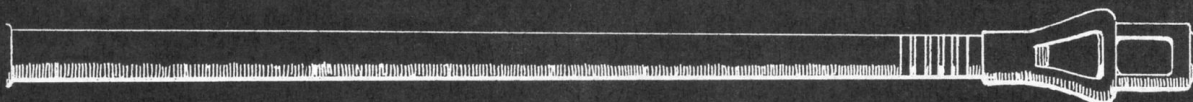


**IN THIS ISSUE:**

**Steam Power for Tanks — M3A1 Scout Car Plans**



# Muzzle Blast



## LETTERS • COMMENTS • NOTES • CORRECTIONS • ADDITIONS

### Last Issue's Cover....

Dear Sir:

I was interested to see your article on the Constabulary Squadron M8 Armored Car in AFV-G2, Vol. 5, No.3, however, you are in error regarding colors. The bands around the vehicle should be yellow-blue-yellow, not white. The background circle for the Constabulary insignia should also be yellow. The insignia is similar to the Constabulary shoulder patch worn by the troopers, and their helmets also bore yellow-blue-yellow stripes. All of this yellow and blue led to their being nicknamed the 'potato bugs' by Germans, as it resembled a local beetle.

One ironic note; as each Constabulary Regiment had a horse platoon, some armored troops had to be 'de-mechanized'. Some of the former tankers were members of the old horse cavalry regiments, and had now come full circle: horse to armor, and back to horse.

Incidentally, that Wehrmacht mechanized unit which was attacked by Polish cavalry may well have had to call for help. Polish cavalry regiments included horsed anti-tank gun units.

Your subscriber,

Eugene Souberman  
Bronx, New York

### ...and 'Armor in Pictures' Answers...

Dear Sirs;

In response to your information request from page 21 of AFV-G2, Vol. 5, No. 1, the vehicles are M59 Armored Personnel Carriers in storage at the Seventh Army Training Center in Grafenwohr, Germany. The wooden superstructure preserves them until they are used as targets for live-fire practice on the various firing ranges.

I was very interested to note that Seventh Army is applying camouflage - it's high time they did. Also very interesting to see the new 'long tube' M109; the A1. The M4 'battle memorial' was very interesting to note, bringing to mind the two German Panthers sitting in front of Les Invalides in Paris, painted a

tan color and bearing Free French markings. I thought that was highly ironic to say the least.

Sincerely,

G. T. Kolba, formerly of  
C Battery, 3/17th Artillery

Gentlemen:

I am writing you in regards to the Armor in Pictures section of your magazine and the picture of the French AFV (on page 23 of Vol. 5, No. 2). I believe this vehicle to be a VP-90 Light Fighting Vehicle equipped with a 105mm recoilless rifle. Below, I have listed some specifications, obtained from the book 'Armored Fighting Vehicles of the World', by C.F. Foss.

Length: 11-feet, 6-inches (hull only)

Height: 3-feet, 2-inches

Weight: 3,300-lbs.

Range: 175 miles (maximum)

Speed: 62 m.p.h.

Engine: Porsche

Horsepower: 55 b.h.p. at 4500 r.p.m.

Crew: Two

Width: 5-feet, 2-inches

Armament varies but the vehicle can be fitted with AT missiles, 20mm and 75mm cannon, machine guns, mortars, flame throwers, bazookas or a 105mm recoilless rifle. This vehicle is somewhat unique in that both crew members lie in a prone position to operate the vehicle, which accounts for the extremely low silhouette.

In regards to the identity of the two vehicles in the background, I believe the right-hand one to be an EBR-75 armored car and the left-hand one to be a Hotchkiss TTA-12 armored personnel carrier, although I may well be mistaken. I hope that this information be may be helpful to your readers and I thank you for providing such a top-grade armor magazine.

Sincerely,

Wade Sears  
Calgary, Alberta  
Canada

### ...And an Error in Captions...

Sirs:

In 'Armor in Pictures' in Volume 5, Number 2 of AFV-G2, there is a picture of a *Marder III*, based on what appears to be a Czech *TNHP* Light Tank chassis (*Pz. Kpfw. 38t*), however, as I looked more closely at the picture, I noticed that there are five road wheels and no provision for a bow machine gun, also other alterations appear to have been made to the basic chassis. I would very much like to get as much information about this vehicle as possible, because it would make a very fine addition to my collection alongside my *Pz. Kpfw. 38t*, *Jagdpanzer 38t Hetzer*, and *7.5cm Pak 40/3 auf Panzerjäger 38t*, all modeled from Italaerei kits.

I wish to compliment the staff of AFV-G2 for publishing such a fine magazine for armor and other vehicle enthusiasts. I have been reading AFV-G2 for several years now and all I can say is that AFV-G2 gets better with every issue, and that it was very good when I first saw it in 1971. Keep up the good work.

Sincerely,

Ronald L. Duncan Sr.  
Garland, Texas

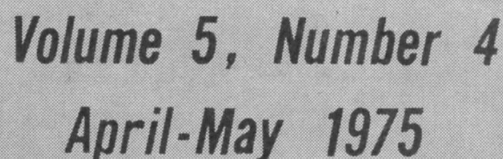
*Editor's Note: Mr. Duncan was only one of several sharp-eyed readers who spotted the five road wheels on the 'Marder III.' and requested clarification. A number of readers, including the author of Profile #50, 'Swiss Battle Tanks', have written in to identify the vehicle properly as an experimental Swiss 75mm Self-propelled Gun, the Panzernahkanone I.. This vehicle was constructed on the Czech LT38 tank chassis, modified by the Swiss to include a fifth road wheel. Constructed during World War II., it appears that only one or possibly two of these vehicle still survive today in Switzerland.*

### ...and a Final Word (?) on Armored Cavalry Troops....

Dear Sir:

I have enjoyed your organization diagram on the U.S. Army Armored

Continued on Page 41



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**Cover:**

Our cover illustration portrays the turret and armament of a West German **Marder** Armored Personnel Carrier. Taken 25 January 1973 during Operation 'Reforger IV.', this photo shows Staff Sergeant Reinhard Bayer of the West German **Panzer-Bataillon 200**. This photo clearly shows details of the 20mm armament and smoke projectors, as well as periscopes and sighting equipment. Photo Credit: 'Stars and Stripes', via Richard Lutz.

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# Steam Power for Tanks



by Col. Robert J. Icks, AUS Ret'd.

The origin of the tank as such during World War I. is usually credited to the British, but the French were working on such a device at the same time, with neither knowing of the other's efforts. But what is not generally known is that the idea for this type of weapon appeared during this period in other countries as well. The Italian Pavesi-Tolatti or Pavesi-Cassali two-turreted tank probably pre-dated both the British and French designs, but it seems not to have progressed beyond the mock-up stage. The Russian Lebedenko was a huge tricycle, which seems to have been built but was not found manageable.

In the United States, Cleve F. Shaffer of San Francisco had tried unsuccessfully in 1914 to interest the German consul there in arming and armoring hundreds of little Fageol orchard tractors. Norman Leeds of the Automatic Machine Company of Hartford, Connecticut built two mock-up hulls on the chassis of the firm's commercial 'Alligator' vehicle, calling them the 'Automatic Land Cruiser I. and II.'. U.S. Patent No. 1,161,267, issued to W. T. Taylor in 1915 covers an amphibious tank bearing a remarkable resemblance to the modern LVT(P)5.

The inspiration for the British and French tanks was the American Holt tractor, then in use in both armies. It therefore was natural that Holt would capitalize on the fact. The Holt plant at Stockton, California built several mock-up hulls called 'Special 18' or 'Scat the Kaiser'. One of these later was refitted with a Cadillac engine, thereby doubling its speed. There also was a tiny HA 15 one-man tank powered by a motorcycle engine and resembling the British heavy tanks of the period. Another Holt vehicle was the G-9, built at the Peoria, Illinois factory. This was a standard 10-ton tractor with an armored box surmounted by a small revolving turret at the front and another

larger one at the rear. It was tested at the Sandy Hook, New Jersey Proving Ground, predecessor to the Aberdeen Proving Ground facility.

The C. L. Best Tractor Company of San Leandro, California built two mock-up types on their CLB 75 tractor. One had a semi-cylindrical hull with a turret and the other was similar but the hull had flat surfaces. These two machines appeared at a Fourth of July celebration in San Francisco in 1917, in maneuvers with units of the California National Guard. Another Best vehicle was a tiny cable-controlled demolition tracklayer known as the Wickersham Land Torpedo, which pre-dated the German 'Goliath' of World War II. by almost 25 years.

Designs from other manufacturers also appeared. One was the Skeleton Tank, a vehicle made up of plumbing pipes and connections and bearing a general resemblance to the British heavy tanks of the period. It was submitted by the Pioneer Tractor Company of Winona, Minnesota. A simple smaller version of a British heavy tank but with a small turret was the Victoria, also known as the Hamilton, built by the Oakland Motor Car Company.

Still others included the Holt Gas-Electric Tank, a boxlike affair somewhat like the German A7V of World War I., and built jointly by Holt and the General Electric Company. By the time the United States had entered World War I., mobilization and production problems were tremendous and decisions regarding armament had to be made in order to make American

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*Photo Above: This view of the Holt Gas-Electric Tank does not show the pack howitzer which was mounted in the front plate. Credit: U.S. Army Ordnance Department.*





*Above: The CLB 75 shown during maneuvers with units of the California National Guard. Photo courtesy of E. E. Wickersham.*

power felt as soon as possible. An Army armament board in Paris recommended that, insofar as tanks were concerned, we should adopt two types, a light and a heavy. But it was not until three months later, in September, 1917, that a final decision in the matter was made and there was no follow-through until December of that year.

Industrially from then on, all was confusion. There were optimistic estimates as to production. The French furnished us with the first Renault FT light tank off their assembly line, which we were to produce as the 'Six Ton Special Tractor (a code name)'. In February 1918, the AEF was told that the American copy would be in production shortly and that the first six vehicles would arrive in France in April. However, in February the drawings had not yet been converted from metric measurements and not all contracts had been let. Order did not come out of chaos until October 1918, and the first few tanks did not reach France until after the Armistice in November.

For heavy tanks, the British Mark VIII. design was

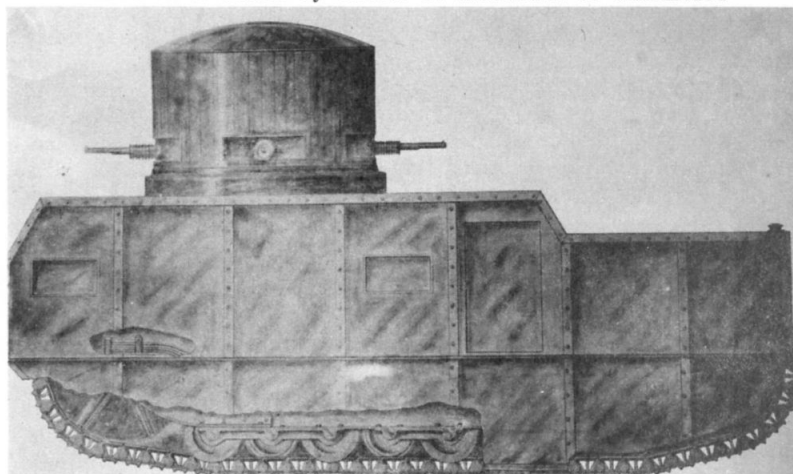
adopted, although none had yet been built. The plan in this case was to divide construction between England and the United States, with assembly to take place in a new factory to be built in France. A few of these tanks were completed in England and 100 were built at Rock Island Arsenal in the United States from parts purchased in England, but not until after the war was over. The Mark VIII. and the Six Ton Tank remained the standard U.S. tanks for years following World War I.

However, part of the confusion over tank production was due to other designs being urged on the Army. Besides the vehicles already mentioned, there was the Mark I., or Ford Three-Man Tank, built by the Hudson Motor Car Company, then owned by the Ford family. This tank had resulted from a request by the Service of Supply in France for such vehicles for security purposes. Ford also proposed the little two-man tank which utilized many standard Model T parts. This vehicle was so well received by the Ordnance Department as a machine gun carrier and tractor that 15,000 were ordered, however, only some 15 reached France before Armistice Day, 1918, and the remainder were cancelled.

In the meantime, the Allied plans for using tanks in large numbers in 1919 included provisions for keeping up the momentum of attack by means of thousands of unarmored



*Above: The Victoria, or Hamilton Tank shown in a 1918 victory parade. Photo courtesy of G. B. Jarrett.*



*Above: The second version of the 'Special 18' or 'Scat the Kaiser'. Photo courtesy of E. E. Wickersham.*

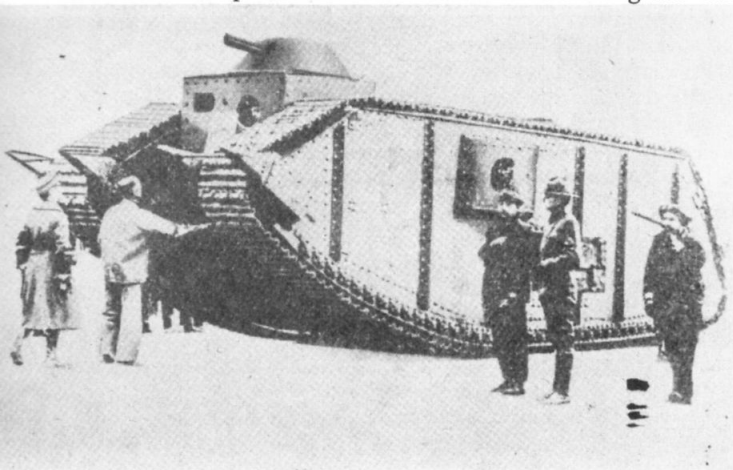


*Above: The Caterpillar G-9, undergoing test at the Sandy Hook Proving Ground. Credit: Wilson History of World War I.*

tracklaying tractors. The British took up the responsibility for furnishing these and adopted a British Ford design known as the Newton Tractor. In addition to production in England, the British contracted with Buick and Studebaker in the United States to build these tractors, known here incorrectly as Buick and Studebaker tanks. Only the Studebakers could have been so called, because that firm also built for the British an experimental armored cover which could be dropped over the tractor and bolted to it. The resulting vehicles resembled a miniature British heavy tank.

All of the vehicles mentioned were gasoline powered. Production, production and more production was the cry of the day, so not much consideration was given to any other form of vehicle production although steam power was not completely ignored. The Holt Company built a 17-ton armored tricycle resembling the German *Trefftas Wagen* of the same period. The Holt Steam Wheel Tank was powered by two Doble steam engines. Another steam-powered tank was known simply as the Steam Tank.

The Steam Tank was a project of the Corps of Engineers. A flamethrower demonstrated in November of 1917 was so successful that the Corps of Engineers decided to build a tank to carry it. There was some reason for the Engineers to become involved in tanks, since the U.S. Tank Corps originated by converting the 1st Battalion, 65th Engineers into tankers. The Engineers had no funds for the project, but a firm of bankers in Boston financed its building, which was accomplished at the Endicott and Johnson Shoe Company. Its design closely resembled that of the British heavy tanks of the day, and its armament comprised flamethrowers and machine guns. The



*Above: The U.S. Steam Tank designed by the Army Corps of Engineers. Photo Credit: 'Tanks' by Inoma.*

Steam Tank weighed 50-tons and it was powered, like the Steam Wheel Tank, by two Doble steam engines.

These were not the first steam-powered combat vehicles ever built, however. In 1900, two unarmored steam-powered cars mounting Colt machine guns had been built by cadets at Northwestern Military Academy, then at Highland Park, Illinois, under the direction of the Commandant, Colonel R. P. Davidson. These cars were used by the cadets in maneuvers for several years, and were driven to Washington, D.C. over the very poor roads of the time. The Russians also built a steam-powered car in 1900. This was the Dwinsky armored car, designed by the Imperial Artillery Committee. It was found to be too heavy and was underpowered, and it was abandoned. The first successful armored steam tractors used in war were built by the British Army during the Boer War in South Africa. These were commercial steam driven Fowler tractors enclosed in armor and drawing armored trailers in train. They were used to carry artillery and personnel.

A review of the background of steam power as applied commercially to automobiles properly begins at about the same time. Steam tractors had been used in agriculture and logging since the 1880's. Steam power was applied to the automobile almost at the same time as the internal combustion engine was. From this review, it will be seen that the application of steam to power armored vehicles would have been a perfectly logical thing in 1917, since steam had been an acceptable commercial fact for some years. However, internal combustion powered vehicle production was much greater, so that with the volume of production urgently needed for tanks, steam took second place.

When the history of the automobile began at the end of the 19th Century, the internal combustion engine represented a fairly compact power package. The external combustion, or steam engine was bulkier and had other drawbacks. Nevertheless, a few engineers worked to eliminate the shortcomings. Among these were the Stanley twins. The Stanleys began building steam cars in 1897. Before long, they were producing some 600 cars each year. However, the twins were not young and were not interested in expanding beyond this point.

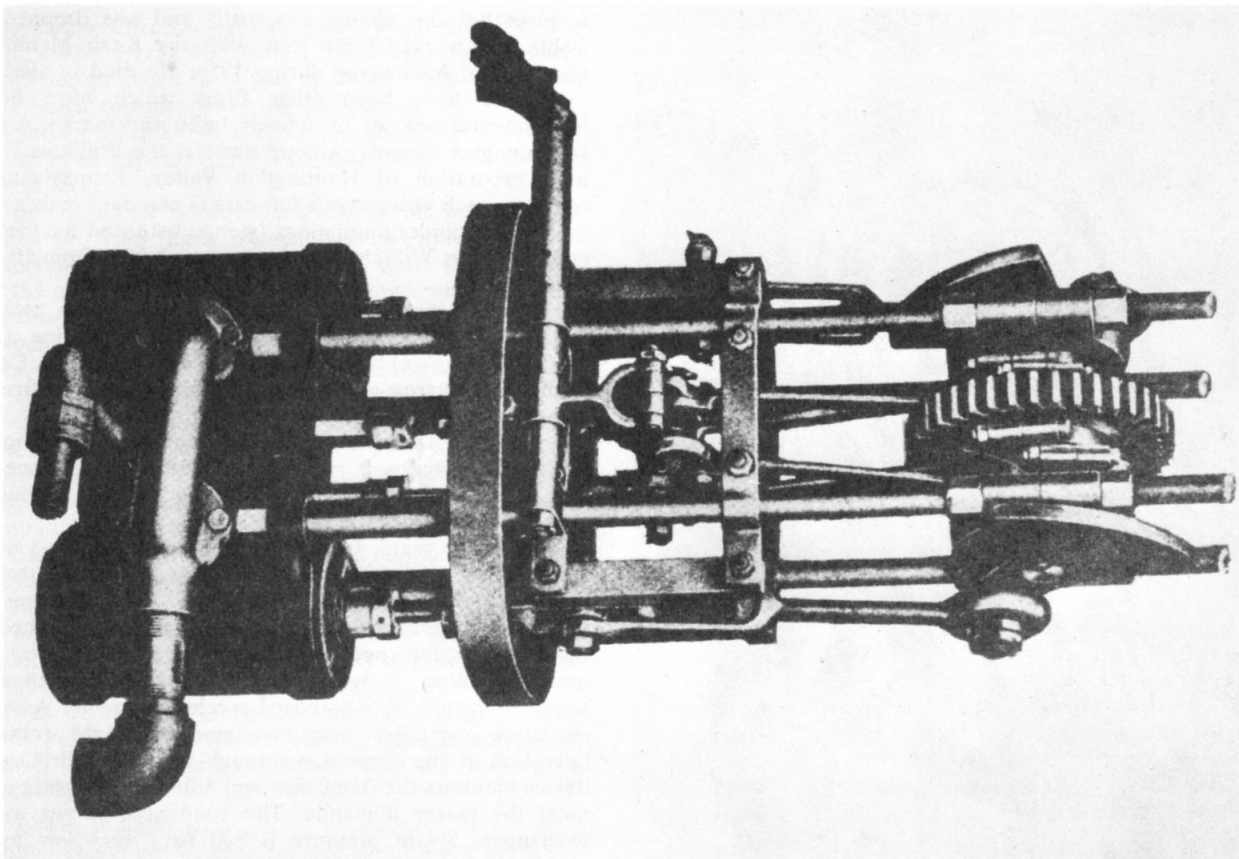
The early Stanley cars were fast but had a limited range. They were costly and difficult to operate. They emitted clouds of steam and some of the larger cities later forced the design and inclusion of a condenser, which added to the cost. By the time of World War I., the age of the Stanleys and the restrictions imposed on the economy by the War Emergency Board prevented further development. After the death of one of the brothers, the company began to decline and finally became bankrupt in 1923.

Locomobile went into the steam car business for a few years beginning in 1898. The White Company, originally a sewing machine firm, began to produce a quality steam car in 1900 and made many steam car improvements. However, by 1910, White decided that the internal combustion engine was gaining in popularity and they dropped the steam car. Eventually, White stopped production of passenger cars and concentrated on trucks.

There were many other American manufacturers of steam cars in the early part of the 20th Century, although none produced any great volume. They included such brand names as Boss, Clark, Conrad, Eclipse, Gardner-Serpollet, Grout, Jaxon, Lane, Meteor, Milwaukee, Mobile, Reading, Steamobile, Stearns and Toledo. European builders included Serpollet in France and Cox, Sheppee and Pearson, and Turner-Miesse in England.

The name 'Stanley Steamer' persists today, perhaps because of the alliteration of the name, but it was the Doble Steam Car that overcame most of the objections to earlier steam automobiles. Development began when Abner Doble built a car while a student at M.I.T. Several years later, an improved model was first shown at the 1917 New York Auto Show. It was an overnight sensation. The Doble firm received thousands of orders but wartime government metals restrictions prevented their being filled. In fact, Doble automobile production was not





Above: The two-cylinder Doble Steam Engine, as used in the Steam Tank. Credit: 'The Modern Steam Car' by Derr.

started until 1922. The Doble brothers, John, Warren, Wilbur and Abner, members of a well-established California engineering firm, then produced a reliable luxury car that was easy to drive. The Doble was guaranteed for 100,000 miles and its quality made it as high priced as a Rolls-Royce.

Some of the Doble four-cylinder steam powered cars are still running today and at least one has logged over 600,000 miles. However, through no fault of their own, the Doble firm became bankrupt early in the Great Depression of the Thirties. By this time, other American firms had sprung up to build steam cars, but these also disappeared from the scene, after building only a few cars each. They included the Brooks, Coats, Delling, Gardner and Gearless. General Motors built a steam car but dropped it. From 1897 to 1925, there actually had been some 80 different steam car manufacturers.

Abner Doble became associated with A. & G. Pierce in New Zealand in 1931, where an A.E.C. bus was successfully converted to steam. He and one brother went to England the following year, where they spent two years acting as consultants to the Sentinel Waggon Works. The Sentinel steam powered truck was then dropped because the firm decided that it could not compete with diesel powered trucks.

At the same time, the two brothers travelled back and forth to Germany, where they licensed two companies that made steam powered railway cars, buses and trucks. Little money was available, however, since Germany was beginning to pour money into arms production. During the same period, the former Allies were still suffering from limited appropriations for military purposes. Hugh stocks had been left over from World War I. and, although experimental combat vehicles were being built in almost every country, money was tight because of the world-wide depression.

As already mentioned, the United States continued to get along with the Six Ton Special Tractor and Mark VIII. tanks, except for a few experimental types. In an effort to stir up some comment as well as the possibility of improving on the Six Ton

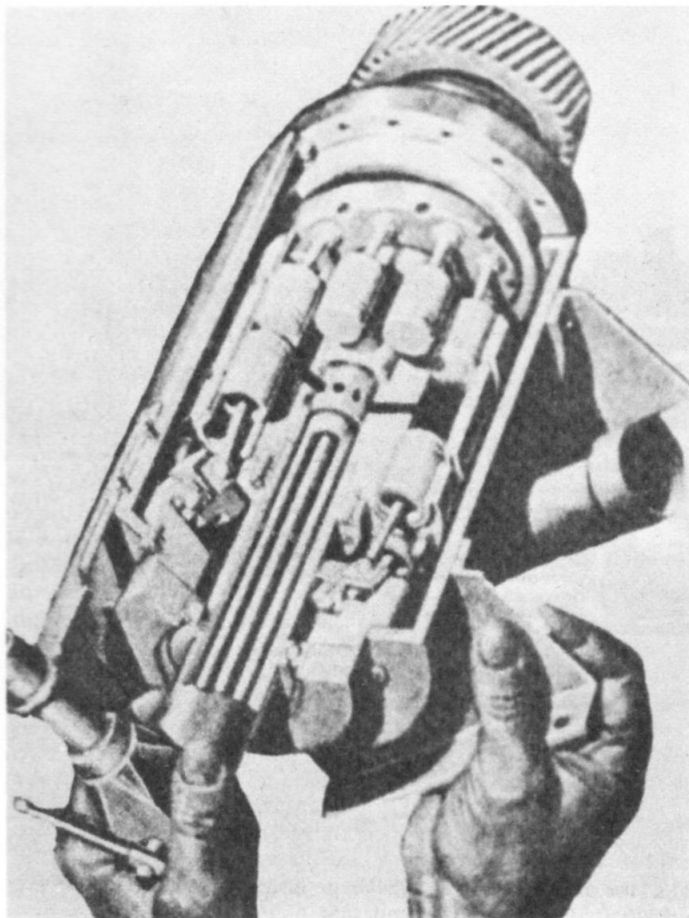
Tank, the author wrote a '1984' type of article for *ORDNANCE* magazine, describing the updating of our Six Ton tanks by converting the suspension to a Christie type. The article drew no comment.

I then wrote an article under the *non de plume* of 'Duffer' with the title 'The New Illyrian Tank'. It appeared in the September 1930 issue of *THE ROYAL TANK CORPS JOURNAL*. Only the Editor and Major Fritz Heigl, the well-known Austrian tank authority, knew I was the author. The article described a mythical country that had rebuilt its Renault FT tanks with Christie suspension. It had a two-cylinder steam engine together with an auxiliary high-speed steam turbine, which drove a commander's combination vision stroboscope and neon light signalling device as well as a triple slotted disc stroboscope for the driver and a turret basket to replace the former hammock seat for the commander. The article was complete with detail sketches and a faked photograph. This article attracted more attention.

Part of the German press was sure that I was describing a new French Renault M29/30 tank being used in Yugoslavia, perhaps because 'Illyria' at one time had been the name for that part of Europe. One German review translated 'Duffer' into '*Quatschkopf*', which was inaccurate as well as uncomplimentary. Dr. Heigl told me that the article appeared to be taken as gospel for some time, with eventual German resentment for having been fooled.

Mention of this episode is made only to indicate that I have been an advocate of the use of steam power for quite some time. During World War II., I tried to get an allocation of \$40,000 for a trial installation of steam power. At that time, I was in charge of automotive testing at Aberdeen Proving Ground and believed it worth while trying anything that would produce better fighting vehicles.

Montgomery's tanks at that particular time appeared unable to catch up with the retreating *Afrikakorps* after the Battle of El Alamein, due to the limited radius of operation of tanks at that period. The Post Engineer (at Aberdeen Proving Ground) happened to be a successful steam power consultant in civilian life. He remarked to me that British tanks should have



*Above: Note the two hands holding the Model XG-2000 Elliptocline 1000-horsepower engine. Photo Credit: Author.*

been powered by steam engines instead of internal combustion engines. When he learned that the World War I. 'Steam Tank' was in the Ordnance Museum, he suggested removing one of its two Doble engines to determine its condition and measurements, with a view to making layouts for an experimental installation in an M4A4 Medium Tank.

Testing the engine with compressed air proved it to be in perfect working order. Layouts showed that installation in the M4A4, which had a slightly longer hull to accommodate the five Chrysler engines around a common crankshaft, was feasible. However, the project was killed. A long list of young Ordnance officers in the Pentagon, most of whom in peacetime were employees of the several automobile manufacturers and oil companies, killed the request with their sarcasm written on the 'buckslips' so common in the Pentagon during World War II. I still have them. Most are humorous, some of them painfully so, but none showed any real thought having been given to the proposal. The rejection was a disappointment, especially in view of the millions of dollars then available for research, with so much of it visibly squandered.

Later, it was learned that Henschel in Germany actually had been making layouts for a steam power installation in a Tiger tank at almost the same time. They found that existing boilers and condensers occupied too much space, and since the OKH was disinterested, the project was dropped.

After World War II., steam power for passenger and commercial automobiles was revived commercially. An American steam car was designed by Thomas S. Derr and was made in 1945, but it got no further than the prototype. McCulloch Motors Corporation engaged Abner Doble as a consultant. They produced a six-cylinder, poppet valve 'Paxton' engine in 1953, but it was never installed in a car. This engine could start in twenty seconds from dead cold! It had many other good

features but the project was costly and was dropped. Abner Doble also worked for a time with the Kean Manufacturing Company of Milwaukee during 1956. He died in 1961.

There have been other firms which have developed experimental engines or actively build and market a range of steam engine designs. Among these is the Williams Engineering Corporation of Huntingdon Valley, Pennsylvania. This company each year sells a few cars of standard makes in which their four-cylinder engine has been substituted for the original engine. Other William's engines range in size from 10 to 1,000 horsepower...

Some of the other post-World War II. steam cars include one with a three-cylinder Paxton Vapor engine (not the McCulloch engine) by Paxve, Inc. of Newport Beach, California. A thermo-Electron one-cylinder car is made by a firm of the same name. A Volkswagen Microbus with a Kinetics Corporation rotary Minto engine is another. This engine is a positive displacement rotary type, with internal reversibility, and has only two moving parts. It is a vapor engine, using Freon gas instead of water.

In recent years, Gene van Grechen in Australia built a 40 horsepower, boxer long stroke steam engine, and installed it in a passenger car chassis. Later, a larger engine of 400 horsepower, delivering 125 horsepower at the wheels, was installed. Engine speed and torque were governed by a steam emission valve, activated by a hydraulic master cylinder, operated in turn by a standard accelerator pedal. A solid-state miniature computer with two memory banks controls the operation of the generator through a photoelectric cell. This device monitors the flame size and adjusts the burner output to meet the power demands. The condenser serves as a heat exchanger. Steam pressure is 800 psi., very low for steam power. The vehicle has a 1,000 mile range before the water needs replenishing.

Since 1963, the Pritchard steam car, built by the Pritchard Steam Power Proprietary LTD., has received considerable publicity in Australia and here. It comprises a Ford Falcon sedan, powered by a two-cylinder V-type steam engine. Prior to this, the firm had produced a steam powered 5-ton truck.

Currently, the State of California is conducting tests of steam powered buses in Oakland, Los Angeles and San Francisco. The vehicles are standard buses powered respectively by a three-cylinder Brobeck made in Berkeley, a six-cylinder Steam Power System engine, and a vapor turbine built by Lear Motor Corporation. The same turbine is intended for the firm's Monte Carlo sedan. Another current test is that of a 100-horsepower Steam Engine Systems Corporation engine in an Ambassador car; this test is being conducted by American Motors for the federal government.

Even later is the 'Fascination' sports car, which is being marketed by Highway Aircraft Corporation of Sidney, Nebraska. This car is powered by a 100-horsepower engine measuring only 5x6x12-inches in size, called a vapor generator steam turbine engine. The engines are made by American Boilerless Steam Engine Corporation.

Controlled Steam Dynamics (now Steamotive, Inc.) does not build or modify automobiles but has developed an eight-cylinder, 212-pound, 600-horsepower engine with the cylinders arranged around a central shaft. The pistons actuate a helix on a rotating drum camshaft. The Elliptocline engine, made by Steam Motor Systems of Winston-Salem, is similar. It has two pistons for each of nine-open-ended cylinders which act against inclined plates instead of a helix. This engine weighs 300-pounds and develops 1000-horsepower at 2,000 psi.

As concerns the application of steam to armored vehicles, the next time the subject was broached after World War II. was in 1954. At that time, Chester Utz, a prominent and respected automotive engineer and then Chairman of the Ordnance-Industry Combat Vehicle Committee, proposed exploration of the matter. He received no support, perhaps again because most committee members had industry responsibilities.

In 1964, Victor Millman, then with Convair Division of



General Dynamics Corporation, proposed a closed circuit steam system for a 42-ton tank and built a three-foot working scale model. The design called for a pair of steam turbines in a full scale tank, each turbine delivering 250-horsepower at 24,000 r.p.m. Including a three-to-one reduction gear, these turbines in full size were expected to be no more than 9-inches by 18-inches in size.

The opposition of the automobile and oil industries is understandable. They have tremendous investments in the internal combustion engine. They maintain staffs that research other means of propulsion, but these staffs are small and the emphasis has been on the gas turbine or the glamor types of internal combustion engines such as the Wankel, the Tschudi and others. Some work has been done by General Motors on the Sterling Thermal engine following pioneer work done by Phillips of Holland. The Ford Motor Company has acquired rights to this engine. The Sterling engine is a hot air engine rather than steam, and the principle is quite old. Combustion takes place outside the engine cylinder and the hot air produced is led through a closed circuit system to double pistons in each cylinder. Gas combustion is continuous and expanding alternate heating and cooling produce the cycle of operation. The engine is silent but it is heavy and costly to produce.

The later developments in steam power have received relatively little publicity. Since the industry and the Army are conditioned to the internal combustion engine, and the public has made no demand for steam because of existing folklore which is hard to dispel, the tactical and logistical advantages of steam power are not being exploited. Here are the myths regarding steam power:

1. Steam power is bulky....

Doubling steam power does require about eight times the heat exchanger volume, but nevertheless, some of the engines themselves, as just noted, are very small. And, delivery of power at the drive sprockets of a tank is the proper method of comparison because it eliminates conventional power train losses. A steam engine needs no power train and, unlike the internal combustion engine, the external combustion engine torque output is maximum even when starting from a stop. Thus, it is estimated that a steam engine of 500-horsepower is the equivalent of a 1000-horsepower internal combustion engine.

2. Water freezes, is subject to scaling, and needs frequent replenishment....

The speed of steam vapor travel greatly reduces scaling. 'Closed circuit' power flow reduces water consumption so that, in modern steam passenger cars at least, water loss is no more than a gallon per 1000 miles. As to freezing, a small electric immersion heater easily prevents this. And there are vapor media other than water. One of these is Freon as used in refrigerators. Freon is cheap, non-toxic, has low freezing and boiling temperatures and is a good lubricant for steel.

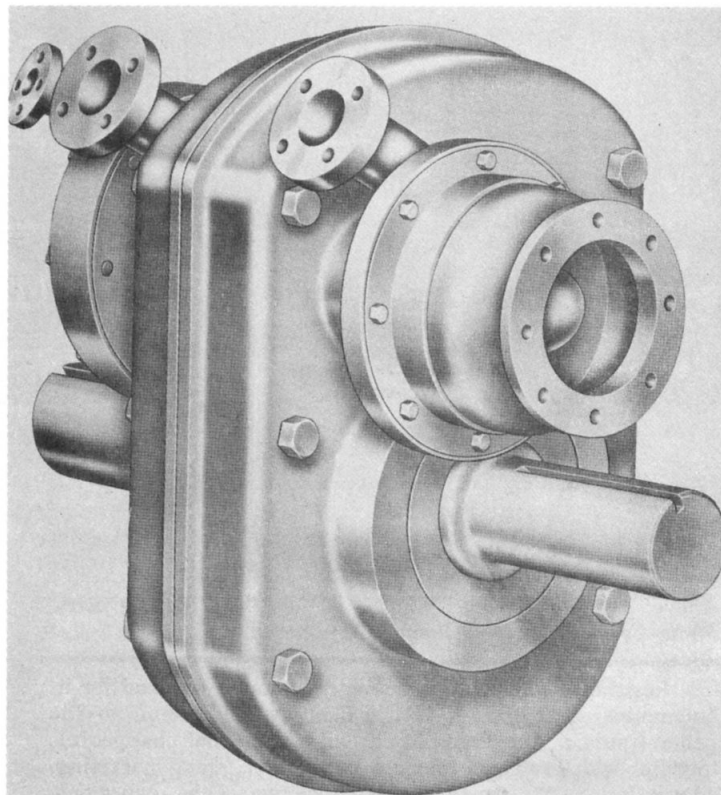
3. Steam carries a risk of high temperatures, boiler explosions and fire....

Effective fail-safe systems which shut off the boiler, permitting operation of the built-up pressure until lowered pressure again turns on the burner have existed for over fifty years. Abner Doble's 1917 car had it as well as the monotube boiler, a small diameter tube coiled in a tight spiral. Exhausted vapor is returned to the boiler or heat exchanger through the condenser to a feed tank where it is recycled. If ruptured, the small diameter tube contains only a small amount of steam. The danger of explosion or fire is less than that of the conventional power package, in spite of working pressures as high as 3000 pounds-per-square-inch.

4. Steam engines require a long time to 'fire up'...

Slow start was eliminated with Abner Doble's monotube boiler. Today, starts take no longer than five to thirty seconds, even in winter.

So, instead of disadvantages, steam engine have many



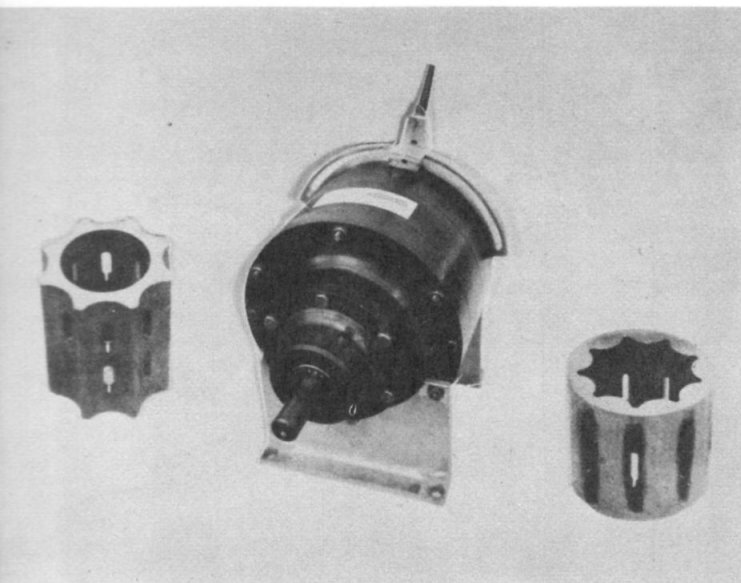
*Above: The Americal Boilerless Steam Engine with Heat Exchanger, Vapor Generator and Condenser. This engine delivers 100 horsepower and weighs less than 125 pounds. Photo courtesy of Highway Aircraft Corp.*

advantages. In addition to those already mentioned, they include fewer working parts, reduced maintenance needs, quietness, freedom from vibration, no increase in noise during acceleration and none in gear shifting since there is no transmission, great radius of operation and good speed control over a wide range.

It probably is true that the accessory load, sometimes called the 'hotel load', would require some form of auxiliary power. In a tank, this load is considerable. However, a small supplementary engine or turbine driving a generator was proved by Doble to be a practical accessory. In fact, another approach to tank motive power might be a steam-driven electric generator with an electric motor driving each track. The French St. Chammond tank and the U.S. Holt tanks of World War I. had gas-electric drive. Some U.S. T23 Medium Tanks in World War II. were similarly powered. They were rejected by the Armored Force because of the claim that there would be too great a danger of being immobilized through enemy fire, however, this hazard exists regardless of the type of motive power used. The T23 tanks were extremely maneuverable. Steam-electric tanks would be equally so.

For passenger automobiles today, the emphasis is on such engines as the Wankel, but mainly from the standpoint of quietness of operation and of eliminating air pollution. These engines are quiet, but success in the matter of air pollution has been less than expected. A few gas turbine powered passenger automobiles have appeared in recent years but these have been distributed only to a few selected owners for marketing tests.

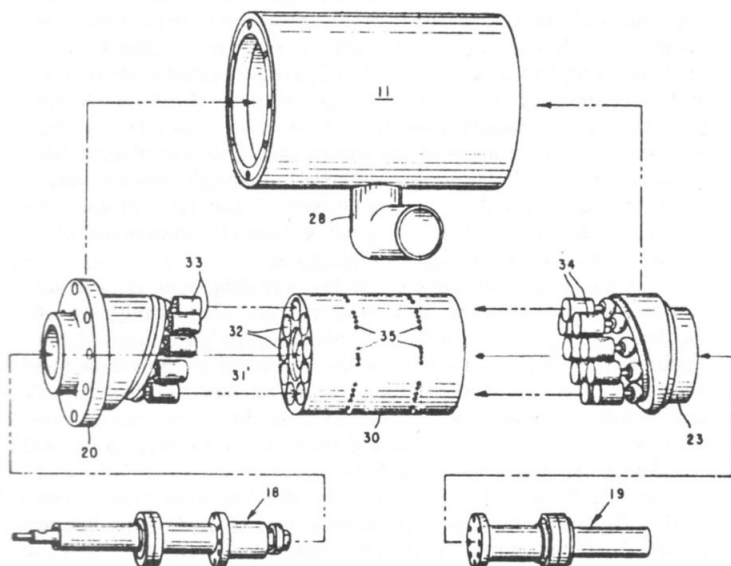
The U.S. Army tested a Solar gas turbine in a T95 tank and an M60 tank test rig is currently operating with an AGT-1500 gas turbine as a possible power plant for our future tanks. A steam engine would provide everything that a gas turbine can and more. Not the least of the advantages of the steam engine is that it does not have the characteristic, self-revealing whine of either the gas turbine or the steam turbine.



Above: The Minto Rotary Engine has only two moving parts.  
Photo Courtesy of the Kinetics Corporation.

Resistance to change is human. Without a demand for it, automotive steam power is not likely to be offered to the general public. The financial cost of commercial changeover, together with problems of mass production, mass marketing, advertising and planned obsolescence would be enormous. Therefore, it is hardly likely that we will see a change to steam for a long time to come, even as a result of the energy crisis or through the demands of ecologists. However, such matters would be secondary as respects military needs. They could be met without any great commercial upheaval. Special tooling would be minimal and machining to high tolerances would not be required to the extent that it is in the case of engines like the Wankel, for example. But even so, for industry to meet a military requirement for steam power would take some time.

However, if the Army could be convinced that the matter is worth exploring and were to allocate sufficient funds for the purpose, the firms already involved should be more than interested in expanding and further developing the existing working engines to meet the requirements of heavy armored vehicles. Certainly there is a great deal more reason to investigate the potentialities of steam power now than there



Above: An exploded view of the parts of an Elliptocline Steam Engine.  
Credit: Author's Collection.

was in the early 1950's, when the Army considered the use of atomic power in medium tanks and actually modified a vehicle to accept an atomic power installation. Steam power is not as far out as that was....

I have continued to feel that some experimentation in steam power was desirable. During the period when a special research committee was convened at Fort Knox for the purposes of setting guide lines for a tank to replace the ill-fated MBT 70, they asked for ideas, receiving a good many. Mine suggested, among other things, that steam power be given some consideration. There was no response. I then wrote an article which was published in *ARMED FORCES JOURNAL* in April of 1973, about the time that the committee made its report. Not one word of comment, one way or another, has appeared anywhere.

Had the U.S. Army started on this steam power project in 1942, in 1954, in 1964 or in 1972, it would by now have been well along toward solution and perhaps even application. Since we do not seem to expect a new tank to replace the basic M60 tank until 1980, it is still not too late to consider steam power in the development of such a replacement tank.

In the article in *ARMED FORCES JOURNAL*, I stated at the close that: 'The preliminary work has been done. All that is needed is to open more eyes to the potential of steam as a source of power for future combat tanks. In the language of the streets: 'If you haven't tried it, don't knock it.' It seems unfortunate to me that the Army is not doing either one.

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Book Review: *AFV Weapons Profile No. 65, 'The PT-76 Light Amphibious Tank & Variants'*, by Christopher Foss (Profile Publications Ltd., Windsor, England, 1974)

Reviewed by Ralph M. Neil

With the closing of the North American Sales and Distribution Office of Profile Publications in Culver City, California, and the financial problems of the home company in England, this publication of an AFV Profile marks a milestone as it may be the last new AFV Profile for a long time.

To begin with, if you are a serious modeler of AFV's, a collector of Profiles, or a student of Russian armor, then this Profile belongs in your reference library despite the various pitfalls in it. In the twenty pages between the covers, the reader will find a very condensed technical history of the *PT-76* and its variants, beginning with the siring vehicle of the line, the *Penguin* cross-country Artic and Antarctic exploration tractor, and ending with the '*M-1970*' multi-purpose tracked vehicle. In the centerspread are T. Hadler's excellent colored artwork of various samples of the *PT-76* line.

The main defect of this Profile lies in the choice of photographs used to illustrate, and in some cases not to illustrate, the various vehicles described. There are two badly washed-out photos of the *Penguin* and the *Frog 2* that should never have been printed. Since both vehicles have been known to western sources since the 1950's, and better pictures have been published in other journals, it is a bit puzzling as to why these two photos were chosen to illustrate those machines. Completely missing is a photo of the Czechoslovak *OT-62 Topas*, a late development based on the *BTR-50PK*.

In the text pages of the Profile, you will find an abundance of technical data tables, a paragraph on the Chinese development of the *PT-76* and a listing of the various countries employing the *PT-76* tank and its variants. However, it really seems that Mr. Foss has attempted to cover too wide a spectrum in the limited space available to him in this Profile.

The most disappointing feature of the Profile is its very brief paragraph on the *PT-76* in combat in Vietnam. The author has drawn on one very limited action to summarize the effectiveness of the *PT-76* during almost a decade of war! The author makes a pendantic statement on why he feels the U.S. M-72 Light Anti-tank Weapons (LAW's) were ineffective in knocking out the *PT-76*, and he continues by bemoaning the fact that the M-72 is a standard weapon in NATO and the British Army. While it is true that storage problems and fuzing problems caused a number of malfunctions in the LAW, in later Vietnam conflict (particularly at An Loc), the M-72 LAW proved itself in combat by knocking out numbers of *PT-76*'s and heavier *T-54* tanks. One can only draw the conclusion that the author needs to conduct far more research....

In the whole spectrum of available literature on Russian armor, this Profile does carve a niche for itself, until a more in-depth study can be written. It can be recommended to be added to your bookshelf.

Our review copy of this Profile was provided by International Hobby Supply, P.O. Box 4563, Panorama City, CA 91402. We understand that this company still has a stock of Profiles and welcomes mail orders.

Book Review: *The Observer's Army Vehicle Directory to 1940*, by B. H. Vanderveen (Frederick Warne & Company, New York & London, 1973, £4.50)

Reviewed by Robert J. Icks

The indefatigable B. H. Vanderveen has done it again! This time, it is *The Observer's Army Vehicle Directory to 1940*. The energy and scholarship of Mr. Vanderveen are constant marvels. This latest volume matches in format the other 'Observer' volumes. Countries covered are Australia, Austria, Belgium, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Japan, Netherlands, Poland, Russia, Sweden, Switzerland, the U.S.A. and a few notes on Argentina, Brazil, Bulgaria, China, Egypt, Greece, India, Iran, Ireland, Mexico, Netherlands East Indies, New Zealand, Norway, Portugal, Rumania, South Africa, Spain, Turkey and Yugoslavia.

As always, the illustrations, although small, are sharp and the book's 380 pages contains an amazing variety of vehicles extending back to before World War I., broken down in most cases into classes. Most of the vehicles described are soft-skinned but quite a few armored cars are included, together with a few off-beat tracklayers. My own collection of armored vehicles is fairly complete but I must confess that Mr. Vanderveen has included some vehicles new to me and in more than one case, he has included new views of vehicles already known to me.

The Olyslager Organization, which sponsors this book, also has sponsored another Vanderveen book which should be mentioned here. This book is also published by Frederick Warne and is titled: *Tanks and Transport Vehicles, World War II*. This is a 6x9-inch picture book selling in England for £3.75. It contains both colored drawings and black-and-white photos. It definitely is a beginners book, but as such is very attractive and should have an appeal to the younger collector and model enthusiast.

Book Review: *Jane's Pocket Book of Modern Tanks and Armored Fighting Vehicles*, edited by Christopher Foss (Macmillan Publishing Company, New York, NY, 1974, 208 pages, \$6.95)

Reviewed by James Steuard

This small pocket-book (measuring 4½ by 7-inches) was published as a handy, small guide to modern armored vehicles of the world. After a brief introduction and a page covering standard abbreviations, the contents are divided into six sections covering: 1) Tanks (Medium & Light), 2) Armored Cars

Continued on Page 40

# ARMOR IN PICTURES

'Armor in Pictures' is a photographic-article series to display reader-submitted material on military vehicles and associated models or dioramas. Readers are invited to submit their photographs of vehicles or models for inclusion in this series. Photos should be packed securely, preferably between sheets of cardboard to prevent folding and/or damage, and sent to *AFV-G2*, P. O. Box 293, La Puente, CA 91747, Attn: 'Armor in Pictures'. Credit will be given in the photo caption for all photos published and all photos will be returned after

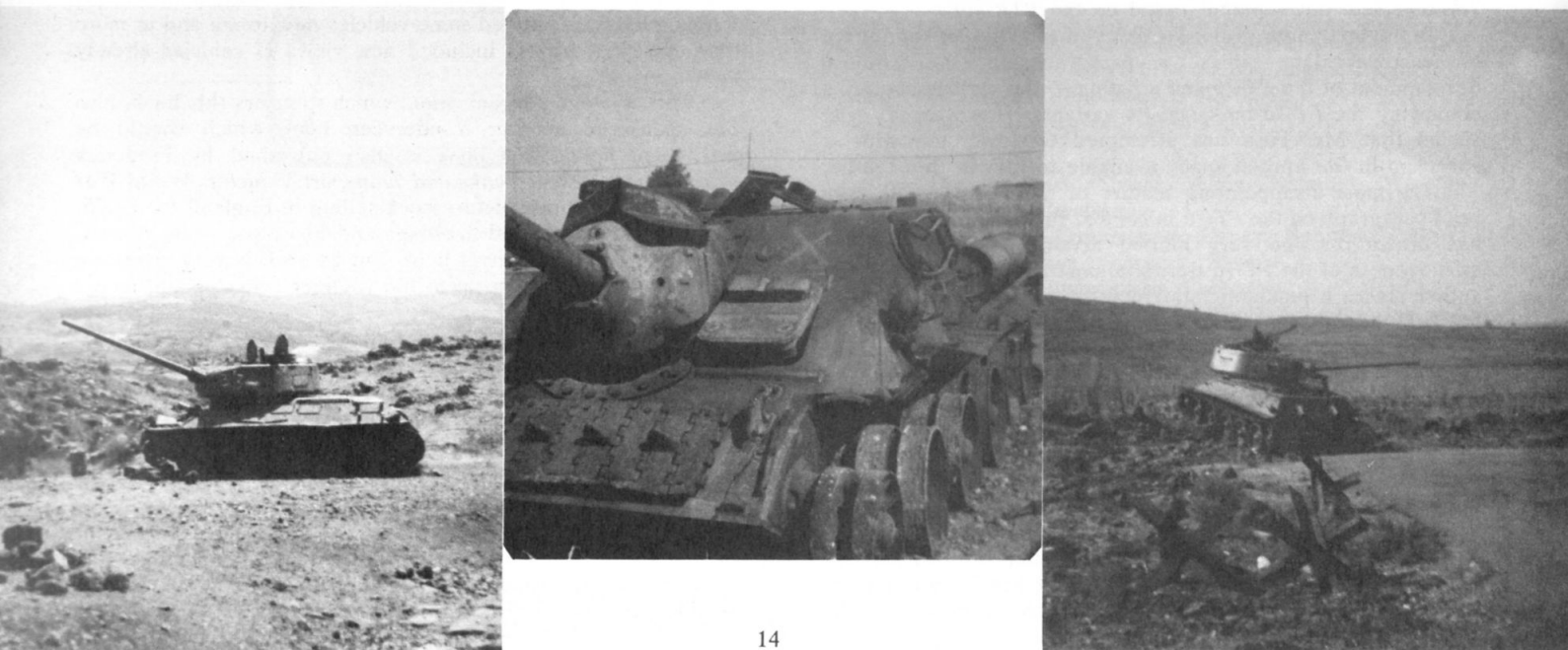
publication, along with a copy of the magazine in which the pictures appear.

'Armor in Pictures' is also designed to serve readers as a forum for photo requests. If there's a particular photo reference needed, for modeling, for data, for accurate markings, etc., drop *AFV-G2* a note (at the above address) to let the staff know what is required. Our staff will attempt to provide the photos that the readers wish to see, and we'll also provide a list of requested photos that readers are searching for.



The photos on this page were taken by Michael Wonsower of Brooklyn, NY, during a trip to Israel in the summer of 1973. They were taken on the Israeli-occupied Golan Heights, and show a number of captured Syrian vehicles which have been left as a memorial to the Israeli assault on the Golan during the 1967 'Six Day War'. The vehicles depicted in the photos are, of course, ex-Soviet T34/85's and an SU-100. The two vehicles in the upper photos were apparently burned-out by phosphorus, as the interiors of the vehicles have a crusty, white coating. All

vehicles have been stripped of everything useful. The center photo below is a close-up of the SU-100 that appears above. Note the bolted-on spare track section and the side attachment points for tow cables. The left and right photographs show two additional Syrian T34/85's, left where they were abandoned by their crews. Note the barely-visible markings (in the left photo) which are still evident after eight years. These two tanks still retain their tracks, although all spare equipment has been removed.



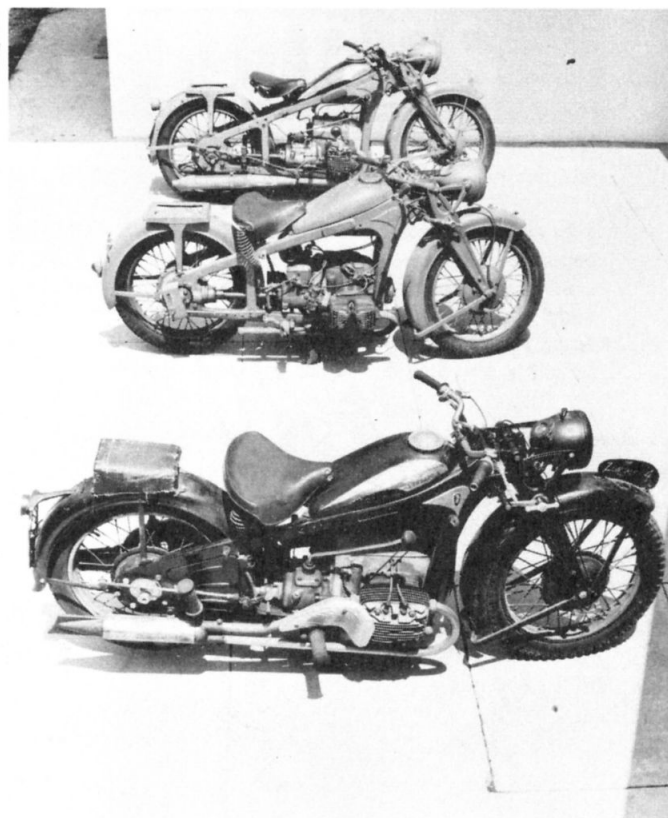
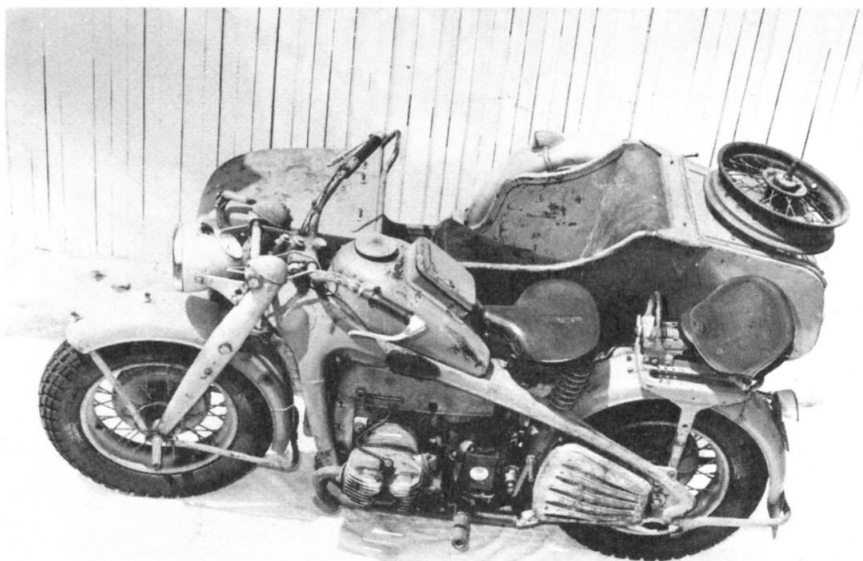




Above: These two photos illustrate a civilian conversion on a World War II M3A1 Halftrack in which a crane was mounted on the rear of the vehicle. Looking sadly treated and ill-maintained, this vehicle sits in an empty lot in North Little Rock, Arkansas. Note that the left track is missing and that little remains of the original bodywork. Photo Credit: William Sanders

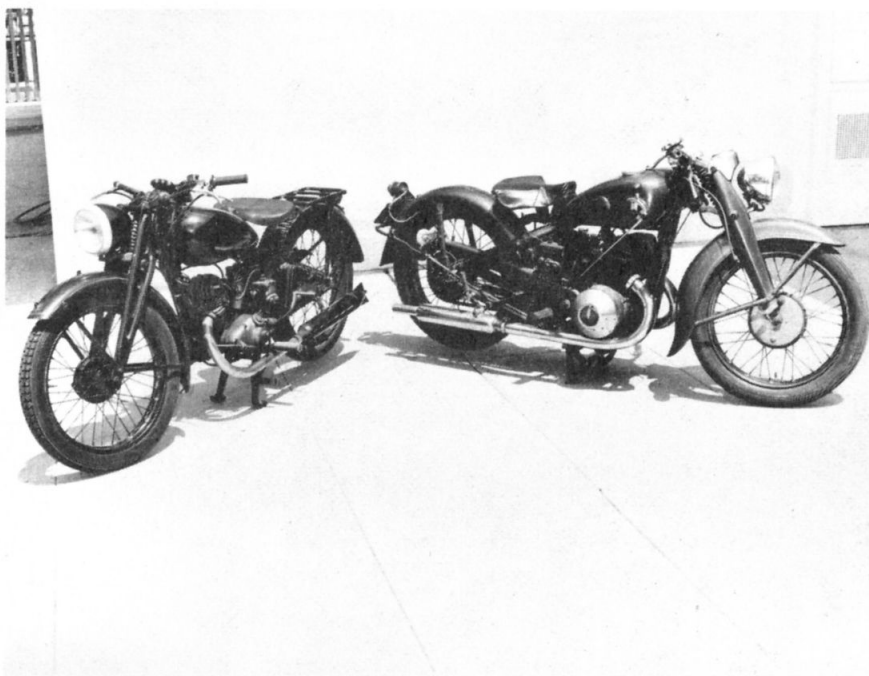
The photo below, submitted by D. R. Haugh, shows a Japanese Type 60 Self-Propelled Recoilless Rifle carriage. This vehicle carries two side-by-side, 106mm recoilless rifles with a .50-caliber spotting rifle mounted between them. Since this vehicle is not in use outside Japan, photos of it are somewhat unusual.





The photos on this page show what is probably one of the largest private collections of antique German motorcycles in the United States. The collection is owned by Mr. Arthur Grigg of Garden Grove, California, and the vehicles in the photos are identified as follows: *Above, left:* Zündapp K 750 motorcycle with sidecar; this is a 1942 machine in original paint finish. *Above, right, from top to bottom:* 1937 Zündapp K 500, 1937 Zündapp KS 500, and a 1938 Zündapp K 800. This last motorcycle is an 800cc, 4-cylinder rarity in original civilian paint finish. *Below, left:* Two DKW motorcycles; the left vehicle is a 1939, 200cc single-cylinder, while the right machine is a 1938, 500cc twin-cylinder. These lighter DKW motorcycles were commonly used by the *Wehrmacht* as light messenger vehicles. *Below, right, from top to bottom:* The motorcycles in this picture are all BMW's... first, an R 71 (750cc SV), made in 1940; next an R 12 (750cc SV), circa 1937; a BMW R 6 (600cc SV), made in 1937; another R 71, circa 1939; and last, an R 4 (400cc OHV Single) motorcycle made in 1935. All of the eleven motorcycles are in various stages of restoration, and many have duplicate engines and spare parts. We understand that Mr. Grigg is planning on selling this fine collection, and if readers are seriously interested in details and prices, they may contact Mr. Grigg through this magazine.

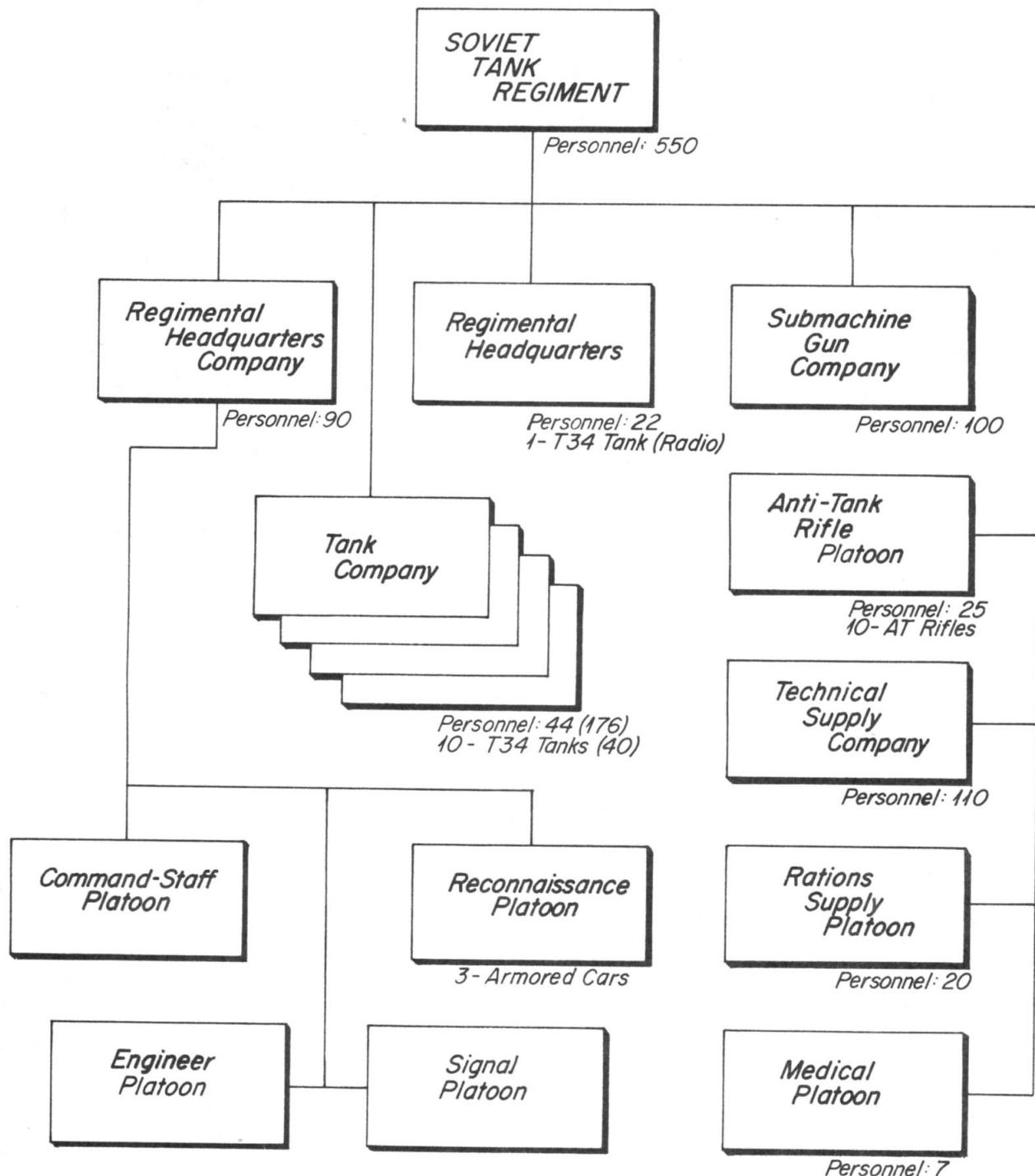
For those readers interested in a closer look at these German motorcycles, Mr. Grigg has promised that we can present photo articles covering the vehicles in his collection. An essay on the Zundapp K 750 motorcycle with sidecar is in preparation.





# SOVIET TANK REGIMENT

DATE: SUMMER 1944  
by W. Larson & J. Steuard



Source: OKW; Abt. Fremde Heere Ost; „Vermutliche Kriegsgliederung eines Panzer-Regiment (auch Garde-Panzer-Regiment)“, (Natl. Archives, T78, R486, Frame No. 6470384)



# When Tanks were called Combat Cars...'

Mechanization in the U.S. Army, 1925-40

by William Platz

Following the conclusion of 'The Great War', the United States Congress, in its less-than-infinite wisdom, firmly decided that tanks were to be the private preserve of the U.S. Army's Infantry branch. This decision was written into the law of the land in the National Defense Act of 1920, and the infant 'Tank Corps' (which had fought as such in the World War) was disbanded. Unfortunately, this congressional whim was to have some serious consequences on the development of American armor. As tanks were seen as merely mobile machine gun nests supporting waves of foot soldiers in the grand assault, 1940 found the U.S. Army with no armored unit larger than a regiment, and there were only two of those. At a time when ten German *Panzer-Divisionen* were massing for their assault on the west, the majority of U.S. armor was scattered among divisional tank companies. Indeed, virtually the only bright spot was at Fort Knox, Kentucky, where the *7th Cavalry Brigade, Mechanized* was stationed. Denied tanks by law, the Cavalrymen had invented 'Combat Cars'.

During the 1920's, it became increasingly clear that the era of the horse was ending and that of the gasoline engine beginning. However, funds were few for the Army and new developments took second place to maintaining the units already on hand. This time period saw the Cavalry reduced to a strength of 15 regiments, with the strength of each of these cut from eight to four troops. Nevertheless, by the latter part of the decade, some progress had been made in the general direction of mechanization.

In 1928, the U.S. Cavalry formed its first fully mechanized unit - the *1st Armored Car Squadron*. Activated at Aberdeen Proving Ground in Maryland, the squadron was equipped with T2 and T3 armored cars as these became available. It was only

partially formed when it was dispatched to join the *1st Cavalry Division* at Fort Bliss, Texas, and it never reached its full establishment. It, however, was a start in the right direction. The T2 series of armored cars were produced in several varieties (and in very limited numbers), all based on the LaSalle commercial truck chassis. The original version was open-topped with a single .30 caliber machine gun fitted on a pedestal mount, but later versions were equipped with a primitive turret, again mounting a .30 caliber machine gun, and the T2E4 had its armament increased to a .50 caliber heavy barrel machine gun.

After its arrival at Fort Bliss, the *1st Armored Car Squadron* continued to experiment with 'jury-rigged' armored cars improvised from locally procured commercial chassis. The results were less than spectacular, but at least a few vehicles were added to the unit's sparse inventory of equipment. The squadron's function with the *1st Cavalry Division* was to supplement the four horse-equipped Cavalry Regiments, with its superior mobility and firepower. Here, it came in contact with the *1st Cavalry Regiment*, which was the unit which was destined to take the next step towards mechanization.

In the meantime, the Secretary of War had been an observer at the British experimental armored force maneuvers held in 1927, and he had returned home something of an armor enthusiast. This led to the creation of an American armor experiment, held in 1930, which involved exercises around Fort

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Above: A photo of a T4 (or M1) Armored Car of 'A' Troop, 1st Cavalry Regiment, Mechanized, taken at Governors Island, New York in 1938. Note the external machine gun mounts and the 1st Cavalry insignia. Photo Credit: U.S. Army



Eustis, Virginia. The troops for the improvised armored force were drawn from all branches of the Army and they were placed under the command of Colonel Van Voorhis, a Cavalry officer. A considerable amount of information was gathered - particularly in view of the sorry state of the available equipment - however, budgetary difficulties caused the experiment to be cancelled. The seed, however, had been planted and it was soon to germinate in the well-fertilized soil of the Cavalry camps and posts.

The appointment of General Douglas MacArthur as Army Chief of Staff marked the beginning of real progress towards mechanization. MacArthur did not favor the concept of a separate armored force, but instead proposed that each arm should proceed towards a fully mechanized ideal on its own, with special attention being paid to its own traditional role in warfare. For the Cavalry, this meant that the highly vulnerable horse must be replaced with a mount that had good cross-country mobility, enough firepower for shock action, and sufficient crew protection to enable it to close with the enemy - in short, a tank. But Cavalry troopers in tanks were illegal, and there was little hope that congress would repeal the law for the sake of efficiency (such action being against its nature). Thus, the 'Combat Car' was born.

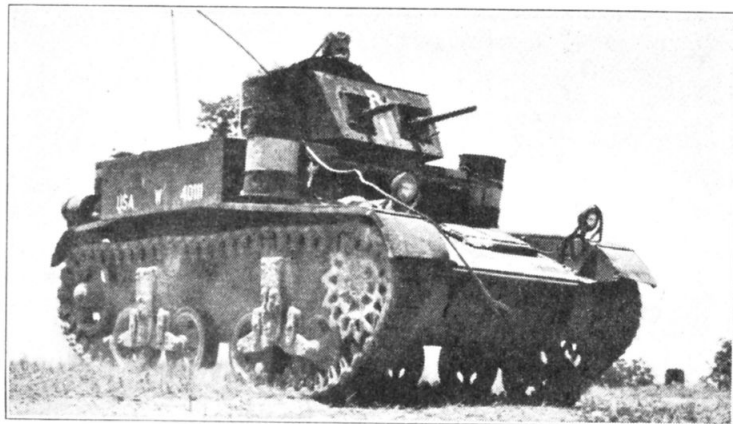
In 1932, four mysterious tank-like objects could be found puttering around the *1st Cavalry Regiment's* billets at Fort Knox. To the uninitiated, these objects looked like tanks. They ran on tracks like tanks, they had turrets, guns, road wheels and other such 'tankish' devices. Indeed, it was very difficult to distinguish them from the three T3 Medium Tanks which had just been delivered to the *67th Infantry (Tank) Regiment* at Fort Benning, Georgia. However, these were not tanks! No, these were the new T1 'Combat Cars', and they mounted a .50 caliber machine gun in place of the 37mm cannon on the T3. Nevermind the external similarities, the T1 Combat Car had the soul of a horse, which was something that no mere tank could ever accomplish.

Having solved the problem of the combat car, the Cavalry now set about to develop its new weapon. On January 3rd, 1933, the *1st Cavalry Regiment* was officially redesignated as the *1st Cavalry, Mechanized*, and it adopted the new organization laid down the preceding year. This called for a Regimental Headquarters and four Troops which were divided into two Squadrons. The first, known as the 'Covering Squadron', was composed of an Armored Car Troop ('A' Troop, with M1 and T2 Armored Cars) and a Scout Troop ('B' Troop) which was equipped with about ten Combat Cars. The second 'Combat Car Squadron' contained two Troops (designated 'E' and 'F') of Combat Cars, making a total of some 35 light tanks (OOPS... 'Combat Cars') in the Regiment. The complement of the unit was set at 42 officers and 610 enlisted men, all transported in various motor vehicles.

The new Mechanized Cavalry Regiment was intended to carry out 'Strategic Reconnaissance' missions, as well as pursuits and screening functions. Experiments were conducted in order to find out the most efficient combinations of equipment and the most suitable tactics.

Unfortunately, the equipment to fill this organization was simply not available. Only five T1 Combat Cars had been received and no further orders had been placed. The T2 Light Tank project was still a year in the future and there was no prospect for any increase in the supply of Combat Cars in the next several years.

In the matter of Armored Cars, the situation was a bit brighter. The T4 Armored Car had been standardized as the M1, and twelve cars (serial numbers W-60114 through W-60125) had been ordered in addition to the prototypes. The M1 was a large (5-ton), robust vehicle was four of its six wheels powered. It was armed with a .50 caliber aircraft machine gun and a coaxial .30 caliber machine gun. This armament was later modified to a single .50 caliber in the turret and a .30 caliber mounted externally, as shown in the photograph.



Above: An M1 Combat Car of the *1st Cavalry Regiment, Mechanized*, at Fort Knox, Kentucky. Note the single turret mounting a .50 caliber and a .30 caliber machine gun. Photo Credit: U.S. Army, via the author.

In the meantime, the Army's Rock Island Arsenal was busy developing a new mount for the *1st Cavalry*. In 1933, work was begun on the T2 Light Tank, which was to be jointly developed for both the Infantry and the Cavalry - a rather fortunate circumstance as the two 'tank' arms were eventually to be merged into an 'Armored Force'. The Cavalry version of the program was designated as the T2E3, and this was standardized as the M1 Combat Car, with production being completed in 1937. The M1 could be distinguished from its Infantry counterparts by a single rotating turret mounting one .50 caliber and one .30 caliber machine gun. A second .30 caliber machine gun was mounted in the hull. The speed of the M1 was officially listed as 45 m.p.h. and it carried a maximum of 5/8-inch of armor. Approximately 115 of the M1's and M1A1's were produced (serial numbers 1/4-40100 through W-40215) by the Rock Island Arsenal.

While the supply of Combat Cars was being secured, the mechanized element of the Cavalry continued to expand. In September of 1936, a second regiment, the *13th Cavalry*, was redesignated as mechanized, and it moved to Fort Knox. During the following year, as the Combat Cars began to arrive, a new formation began to take shape. The Cavalry units were soon joined by a Quartermaster Company and a battalion of field artillery to form the *7th Cavalry Brigade, Mechanized*. At last, the United States had an armored formation, albeit one without a single 'tank'.



A brand-new M3A1 Scout Car of the *22nd Reconnaissance Squadron* at Fort Knox, Kentucky in 1940. Note the two water-cooled .30 caliber machine guns and the early-style unit markings on the bumpers. Photo Credit: White Motor Corp.



Mechanization was not restricted to just the two designated Cavalry regiments. In 1934, the Cavalry discovered the Scout Car. The original version, the T7, was an open-topped, 4x4 vehicle, lightly armored (1/4-inch only), with fair cross-country performance and excellent mobility on roadways. The vehicle carried three machine guns and enough personnel to man them. In all, it was an almost perfect replacement for the horse. (Unfortunately, it could not jump fences or subsist on hay, nor was it much good for polo.) During the 1930's, the Scout Car was widely used by various Cavalry units. A Scout Car Platoon was even attached to each of the horse-mounted regiments, and by 1940, they were also the principal equipment of the Cavalry Reconnaissance Troop assigned to each of the Infantry Divisions. The T7 and M1 Scout Cars bore strong resemblance to the touring cars of their day; however, the M3A1, which was the last and most numerous variant, was distinctively military in its appearance. The latter also proved a most flexible vehicle - acting as personnel carrier, armored car, mobile command post, ambulance, or whatever was needed.

At the outbreak of war in Europe, the U.S. Cavalry was probably the best prepared branch of the Army. This was not saying much, as twenty years of a parsimonious congress, a fuddle-headed command structure, and a general lack of interest on the part of both the public and the government had virtually destroyed the Army as an effective fighting force. The 100 or so Combat Cars of the Mechanized Brigade were the main element of American armor and the only formation trained to operate as a unit in the type of warfare soon to be encountered in the European conflict. While the 2300 personnel

*Above: Khaki-clad Cavalry troopers of the Machine Gun Troop, 1st Cavalry Regiment, Mechanized, dismount and advance in an exercise conducted in Summer 1939. Note the 1st Cavalry insignia and the Troop markings. Covering fire support is being provided by the vehicular .30 and .50 caliber machine guns. Photo Credit: White Motor Corporation.*

assigned to the brigade were just over half of its establishment, its equipment was relatively modern and available in reasonable quantity.

By 1940, the Regular Army's Cavalry consisted of the two Mechanized Regiments, two Horse/Mechanized Regiments (the 4th and 6th Cavalry), ten Horse Cavalry Regiments in the Continental United States, and one Regiment (the 26th Cavalry) in the Phillipine Islands. To these should be added the Cavalry Reconnaissance Troops attached to each of the eight Regular Army Infantry Divisions and the divisional Troops of the 1st and 2nd Cavalry Divisions. All of these formations had undergone a close scrutiny and new tables of organization had been promulgated between February and April of 1940.

Among the changes was the establishment of a new type of unit - the Horse/Mechanized Cavalry Regiment - which was intended as a corps-level reconnaissance unit. This was perhaps the ultimate in Cavalry mechanization in that it provided motor transportation for the horses. The personnel and equipment were essentially the same as for the horse cavalry, but a number of large vans were provided to carry the mounts, thus increasing the regiment's strategic mobility. The concept was short lived, however, as the days of the horse in warfare were





limited by progress in military technology.

The Horse Cavalry Regiments themselves were provided with a substantial increase in the numbers of motor vehicles. For the Headquarters Troop, these consisted of 24 trucks (1½ and 2½-ton), 14 motorcycles and 12 Scout Cars (M3A1's). The latter were combat vehicles and were employed as supporting elements for the mounted troops. They were gathered into a Scout Car Platoon which was attached to the Headquarters Troop. The unit was composed of five sections, each containing two M3A1 Scout Cars and a Motorcycle/Scout. The cars carried a four man crew and were each equipped with two .30 caliber heavy machine guns, one .50 caliber machine gun and one .45 caliber Thompson sub-machine gun. Individual sections operated independently and each had a Lieutenant as Section Leader. These cars gave the horse cavalry quite an advantage, particularly in counter-reconnaissance operations.

Perhaps the greatest modifications, however, were made to the Mechanized Regiments. These were greatly expanded, both in the amount and the types of equipment. The number of Troops was increased from four to ten, and the addition of a machine gun and a reconnaissance element added flexibility to the formation's operations. Under the new organization, the Mechanized Regiment was authorized a strength of 67 officers and 1,081 enlisted personnel (note that all figures cited are for the peace-time establishment) for the Mechanized Regiment and its components, which were divided into three 'Combat Car Squadrons', each with independent reconnaissance, machine gun, service and headquarters troops in support.

The Mechanized Cavalry Regiment itself was designed for employment within a brigade formation, using the machine guns of its vehicles. (There were no gun-armed tanks in the Regiment.) The Regiment was supported by the artillery attached to the Brigade, and it used its mobility to carry out reconnaissance and combat missions. The intent was to provide a unit capable of shock action which could perform scouting

*Above: A photo taken during the Second Army Maneuvers, which took place in Arkansas in September of 1941. This photo shows personnel and horses of Troop C of the 107th Cavalry Regiment, an Ohio National Guard mechanized/horse cavalry unit. This photo shows the 'portie' units which carried the horses; each van carried eight horses and eight men, plus one day's forage. This system permitted rapid deployment of horse units over a distance. Photo Credit: U.S. Army via R. L. Fines.*

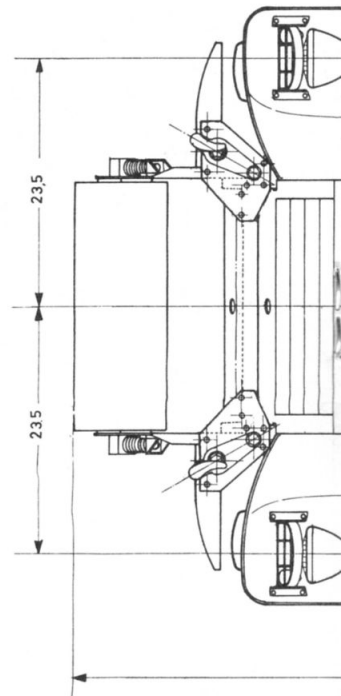
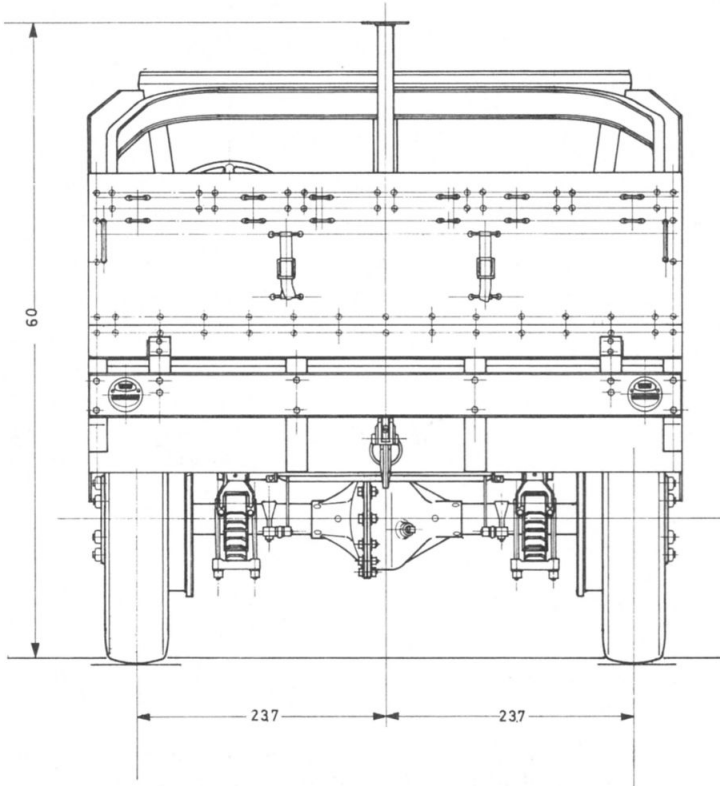
duties and the traditional screening functions of the mounted Cavalry arm.

The primary components of the Mechanized Cavalry Regiment were the three Combat Car Squadrons. Each contained 27 M1 and/or M2 Combat Cars (one in Squadron Headquarters and 13 in each of two Troops). The Combat Car Squadrons provided the regiment with a means of mounted assault. In the attack, the three units operated together, concentrating against the enemy flanks and other weak points. The assault was made at the best speed consistent with the terrain and visibility, the idea being to close with the enemy before he had an opportunity to deploy his anti-tank weapons. As soon as possible after crossing the line of departure, all cars opened fire with their machine guns on the suspected enemy positions, maintaining continuous fire as they approached. In the rear, the 4.2-inch mortars of the regimental Headquarters Troop supported the assault with a deluge of white phosphorus shells, while the supporting Machine Gun Platoons followed behind, mopping up and consolidating the ground gained.

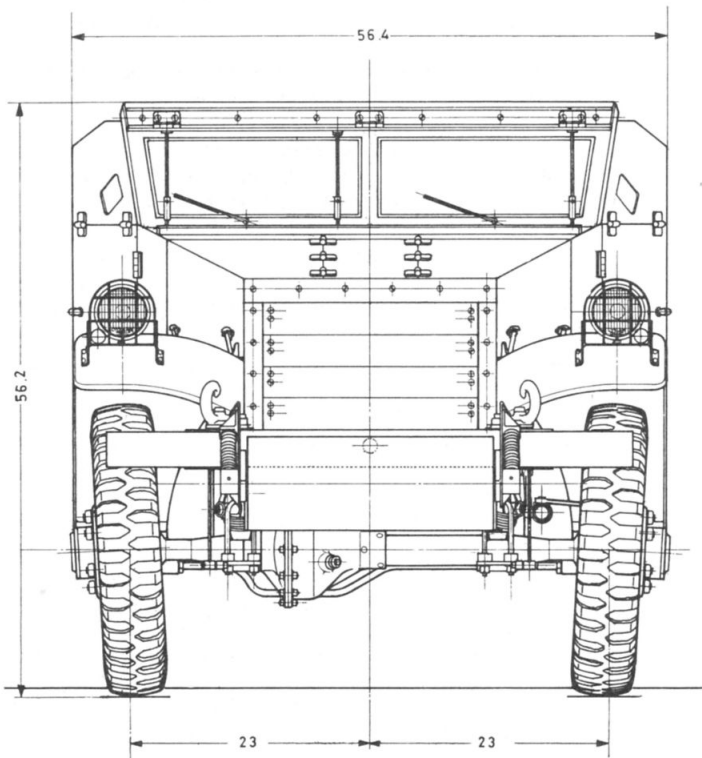
It should be remembered that these rather simple tactics were designed for employment against infantry - *not* armored formations. Indeed, there was not a single weapon in the regiment which could counter the German *Panzer III*'s then overrunning most of Europe. Nevertheless, the two Mechanized Cavalry Regiments were the largest and most effective body of

Continued on Page 40

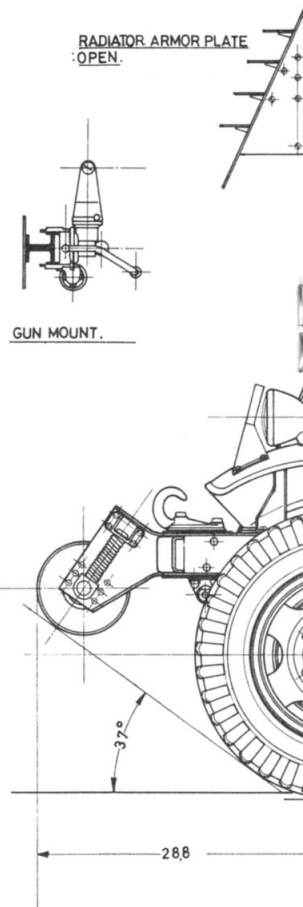
# U.S. Army M



Drawn by Y. Tomioka

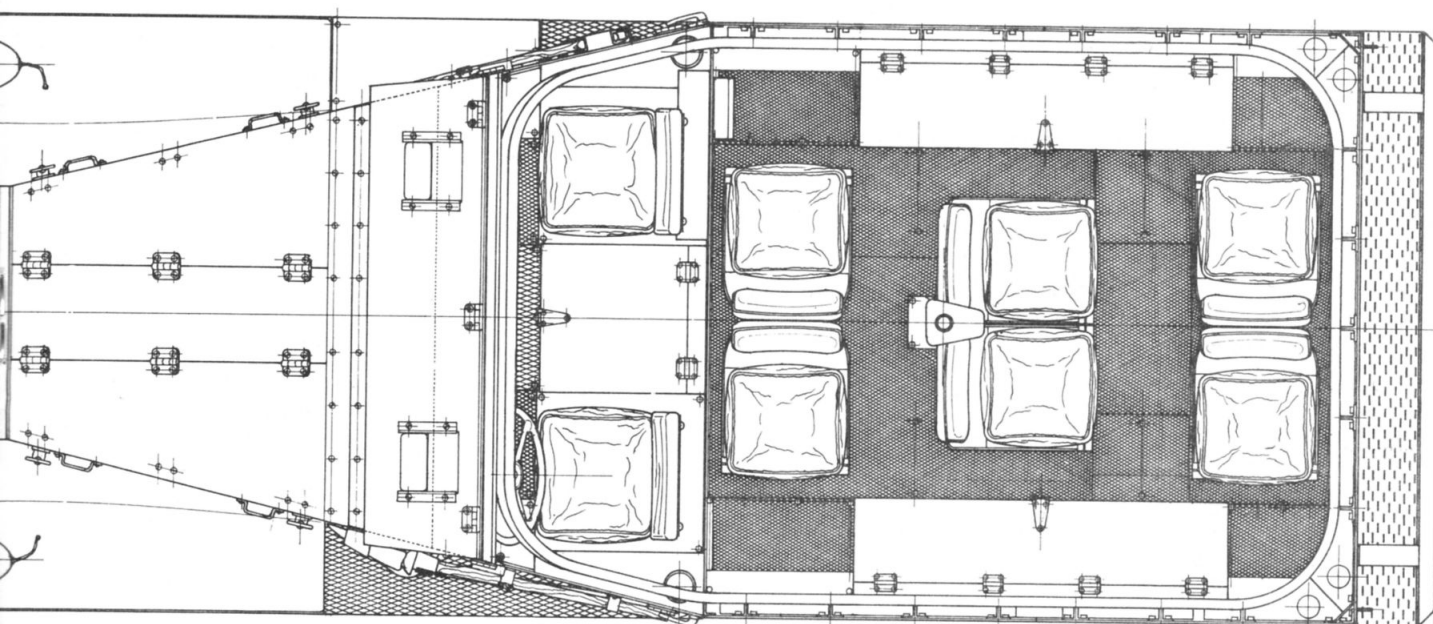


Scale: 1/24

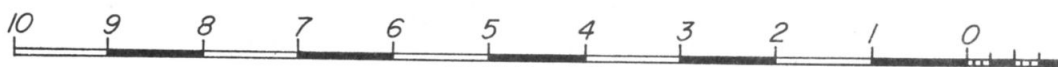




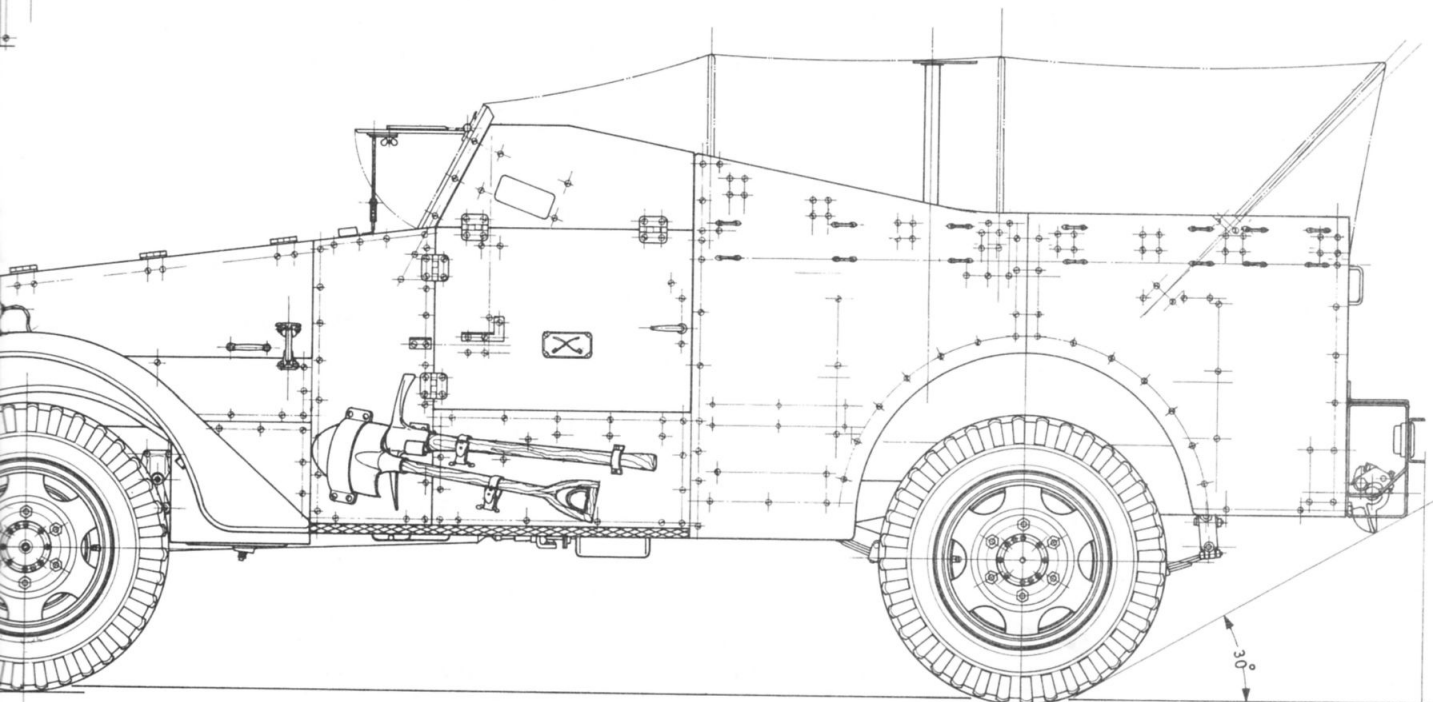
# M3A1 Scout Car



162



SCALE: 1:24



95.0

38.2

# COLOR 'N CAMOUFLAGE

The German *Panzerkampfwagen II*.

by William Platz & Steve Cobb

Perhaps the greatest advantage of the German *Panzertruppen* during the early phases of World War II. was their ability to make effective use of the large number of light tanks on hand. In the latter half of the 1920's, the leading military powers had looked to the small, machine gun-armed, fully-tracked armored vehicles as an inexpensive and quick means to mechanization. The Italian CV-3, British Mk.VI. Series, U.S. M1 and M2 Light Tanks, and the Soviet T26 and T27 were all products of this trend; but by far the most successful was Germany's *Panzerkampfwagen II*. The reason for this less the individual superiority of the *Panzer II*. than the way in which it was grouped with medium tanks in the *Panzer* battalions.

An excellent example of this organization was the 8. *Kompanie*, *Panzer-Regiment* 5. In March of 1941, *Panzer-Regiment* 5. moved from southern France to Tripoli, Libya, where it was to form the nucleus of the new 5. *Leichte-Division*. Originally part of 3. *Panzer-Division*, the regiment arrived in North Africa still bearing that division's tactical marking, and with its vehicles still painted 'Panzer Gray'. The 8. *Kompanie* was part of the II. *Abteilung* (or Battalion), and it was equipped with ten *Panzer IV.*, *Ausf. D* tanks and twelve *Panzer I.* and *Panzer II.* light tanks. At this time, the *Panzer IV.*, with its short 75mm gun, was mainly employed in an assault gun role, and the light tanks provided cover for them against hostile infantry and light armor.

The *Panzerkampfwagen II.*, *Ausführung B* depicted here belonged to the 3. *Zug* (Platoon) of the 8. *Kompanie*. Actually, it was the fourth vehicle in the platoon, which also included another *Panzer II.* (numbered '833') and three *Panzer I.*s (numbered '831', '832' and '835'). It is shown as it appeared during the parade of March 12th, 1941 in Tripoli. The tank was 'Panzer Gray' in color, with a good supply of tactical and identification markings.

The most obvious of these insignia was the 15-inch high identification number which appeared on both sides of the turret. Each digit was formed by a one-inch wide white outline, painted over the blue-gray base color; and the whole number consisted of three digits. The first number designated the *Kompanie*, the second number the *Zug* (Platoon) and the third number indicated the individual vehicle. The identification numbers carried by vehicles of the 8. *Kompanie* were as follows:

NUMBER	VEHICLE TYPE	REMARKS
800	Panzer IV.	Company CO
802 (*)	Panzer IV.	Company Exec. Officer
811	Panzer IV.	1st Platoon Leader
812	Panzer IV.	1st Platoon, 2nd Tank
813	Panzer IV.	1st Platoon, 3rd Tank
814	Panzer IV.	1st Platoon, 4th Tank
815	Panzer II.	1st Platoon, 5th Tank
821	Panzer IV.	2nd Platoon Leader
822	Panzer IV.	2nd Platoon, 2nd Tank
823	Panzer IV.	2nd Platoon, 3rd Tank
824	Panzer IV.	2nd Platoon, 4th Tank

## PANZER BLUE-GRAY

5 pts Floquil RR12 Reefer Gray  
2 pts Floquil RR10 Engine Black  
2 pts Floquil RR56 Big Sky Blue

825 (*)	Panzer II.	2nd Platoon, 5th Tank
831	Panzer I.	3rd Platoon Leader
832	Panzer I.	3rd Platoon, 2nd Tank
833	Panzer II.	3rd Platoon, 3rd Tank
834	Panzer II.	3rd Platoon, 4th Tank
835	Panzer I.	3rd Platoon, 5th Tank
841 (*)	Panzer I.	4th Platoon Leader
842 (*)	Panzer I.	4th Platoon, 2nd Tank
843	Panzer II.	4th Platoon, 3rd Tank
844	Panzer II.	4th Platoon, 4th Tank
845 (*)	Panzer I.	4th Platoon, 5th Tank

The same three-digit identification number appeared on the rear of the vehicle, painted on a rhombic-shaped metal plate. These numbers were in solid white, approximately 5-inches in height. The only other rear marking was a 3. *Panzer-Division*' tactical insignia, which was painted in yellow on the right side stowage box. The symbol was that adopted by the 3. *Panzer-Division* after the fall of France the preceding year, and the same tactical marking was also displayed on the front of the tank beside the driver's visor.

The sole remaining marking on this particular *Panzer II.* was the National Identity marking, a 10-inch square German cross, which was painted on each side of the hull just beneath the turret. In style, the cross had thick white outer edging in order to provide better identification against the dark vehicle paint finish.

The markings described above were valid only for a short period of time. By the end of March 1941, *Panzer-Regiment* 5. had camouflaged its tanks with sand colored splotches over the 'Panzer Gray', changed its tactical insignia from that of 3. *Panzer-Division* to the stylized 'B' of 5. *Leichte-Division* (later 21. *Panzer-Division*), and embarked on a campaign which would carry it to the outskirts of Tobruk.

On June 22, 1941, 746 German *Panzer II.*'s had dashed across the Soviet border to start Operation *Barbarosa*. However, by the following spring, the *Panzer II.* was fast disappearing from the *Panzer-Kompanien* as a main tank. Nevertheless, the vehicle could still serve as a reconnaissance tank with some success. Our second vehicle served in this role.

7. *Panzer-Division* was one of the few divisions which had a three battalion *Panzer-Regiment*, and at the time of the start of Operation *Barbarosa*, it was equipped with ex-Czechoslovak tanks better known by the designation *Panzer 38(t)*. As the campaign progressed, these vehicles were gradually replaced in early 1942 by *Panzer III.* and *Panzer IV.* medium tanks. At the same time, a platoon of light *Panzer II.*'s were added to each battalion headquarters. The *Panzer II.* shown opposite was one from the headquarters of the III. *Abteilung* of *Panzer-Regiment* 25., the tank regiment of the 7. *Panzer-Division*.

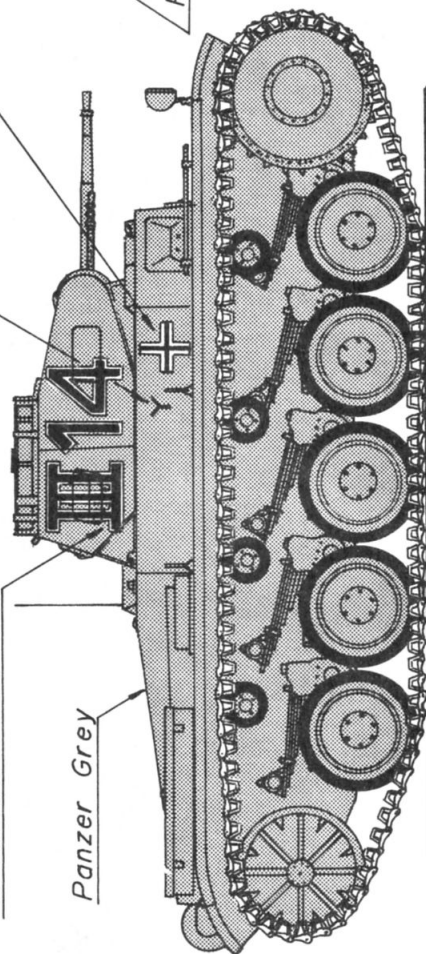
Again, the most prominent marking was the turret identification number. As with the previous example, these numbers were 15-inches in height with a one-inch white outline; however, the center of these numbers was painted in 'Insignia Red'. The Roman Numeral 'III' designated the vehicle as being from the 3rd Battalion's *Stabs-Kompanie* (or Headquarters Company), while the number '1' identified the Light Tank Platoon (*Leichte-Zug*). The third number identified the individual tank within the platoon (here, number 4 tank of a five tank platoon). The other tanks within the Headquarters Company carried a number '0' as the middle digit of the identification number.



4" Tactical Symbol

15" Red with White Outline  
Identification Numbers

Panzer Grey



Panzer II, Ausf "B", 3rd Batt, Light Tank Company  
25th Panzer Regt, 7th Panzer Division, Russia 1942

10" Black & White  
National Marking

4" Tactical Symbol

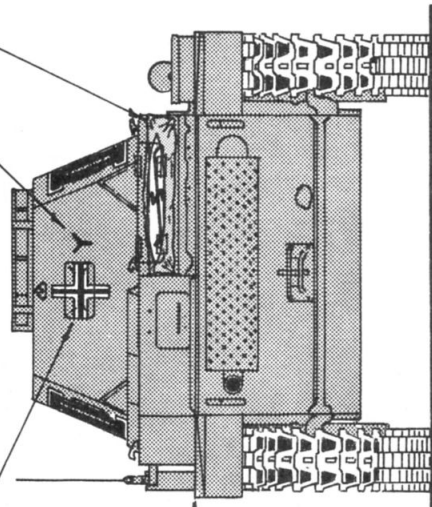
PARTIAL FRONT VIEW

Panzer Grey

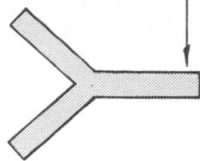


Nazi Flag on Rear Deck

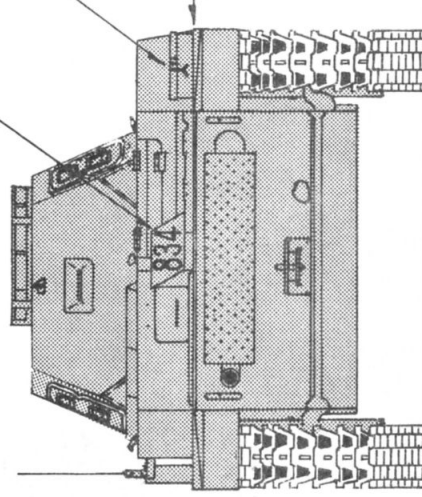
4" Tactical Symbol



TACTICAL SYMBOL  
7th Pz. Div. (Yellow)

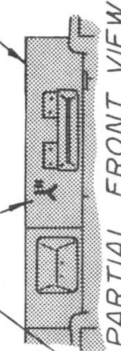


5" White Company Numbers on  
Rear Identification No. Plate

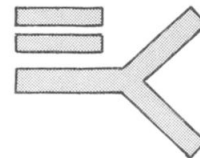


4" Tactical Symbol

Panzer Grey



Panzer Grey

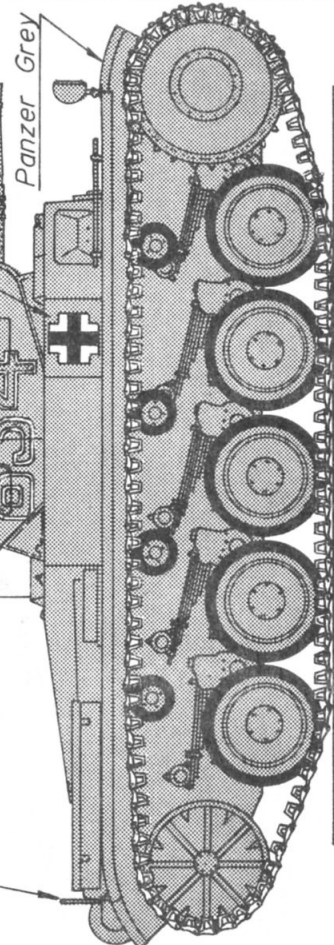


TACTICAL SYMBOL  
3rd Pz. Div. (Yellow)

10" Black & White National Marking

15" White Outline Company  
Identification Numbers

Rear Identification  
Number Plate



Panzer II, Ausf "B", No. 8 Company, 2nd Batt.,  
5th Panzer Regt, 5th Light Division at Tripoli North

Africa — 1941

# Vehicle Close-up:

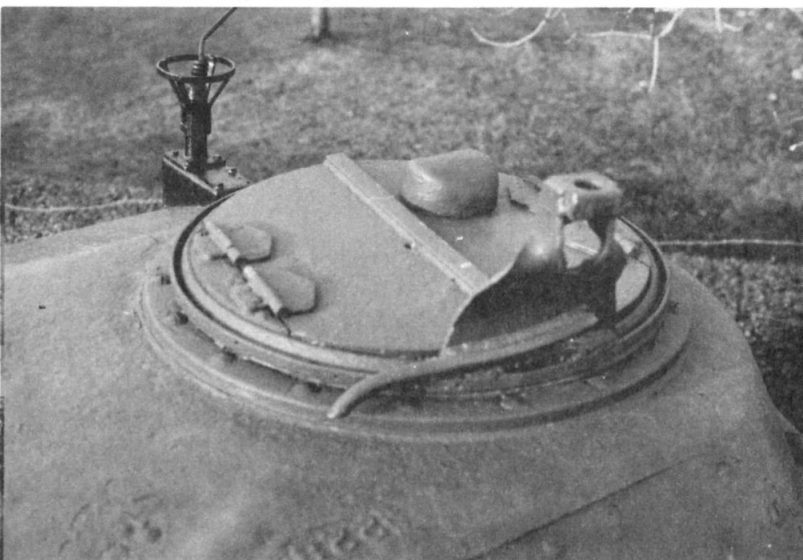
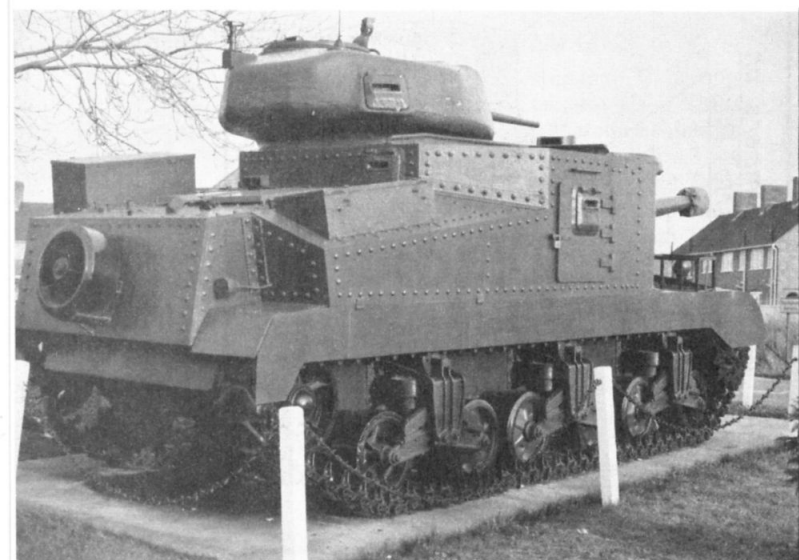
Field Marshal Montgomery's  
M3A5 'Grant' Command Tank  
by Sgt. Gary Simpson



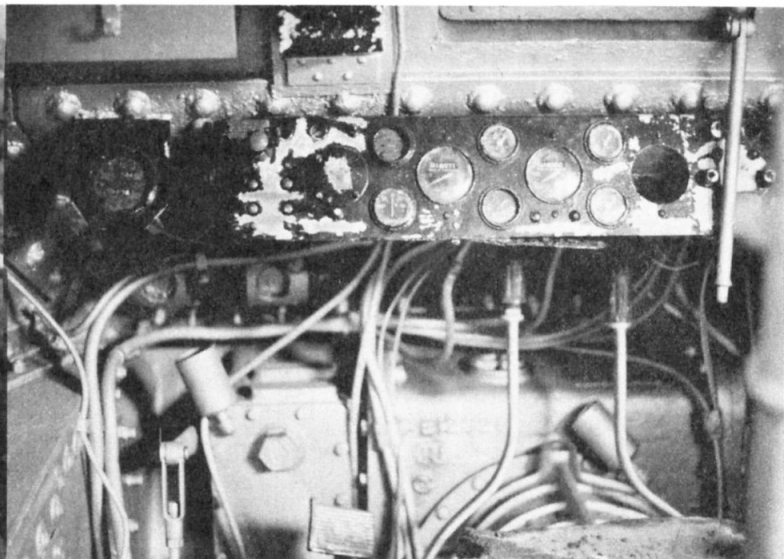
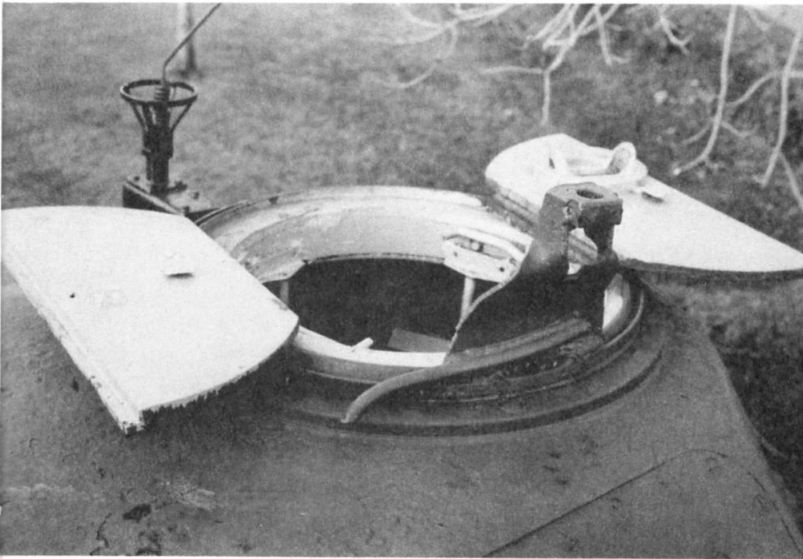
The vehicle shown in this issue's 'Vehicle Close-up' is on display at Basingbourne Barracks, Cambridgeshire, England. It is the actual vehicle used by Field Marshal The Viscount Montgomery during the period of time when he commanded the British Eighth Army. As can be determined from the rear deck details, the vehicle is an M3A5 'Grant' Medium Tank, suitable modified for the command tank role. The vehicle is in excellent condition and has been well maintained, both inside and out. As can be seen from the photographs on the next page, the author received permission to enter the vehicle to photograph details; this is the first time anyone has asked for permission to enter the vehicle, according to personnel at the barracks. The photographs above show a front and a partial left side view of the tank; note the canvas-covered muzzle counterweight for the

75mm gun, the fender sand skirting (or shields) and the different types of road wheels on the tank. *Below, left:* An angled rear view of the 'Grant', showing the spare road wheel mounting and the external stowage boxes on the tank. This view clearly shows the shape of the Grant's 37mm turret. *Below, right:* This photo is a view of the Commander's hatch on top of the 37mm gun turret, looking from the front towards the rear. Note the antenna mount on the rear of the turret, and the added bracket, which was apparently constructed to hold binoculars or an artillery observer's scissors telescope. The hatch is a two-piece affair; note the rearward-pointing periscope mounted in the right hatch half.

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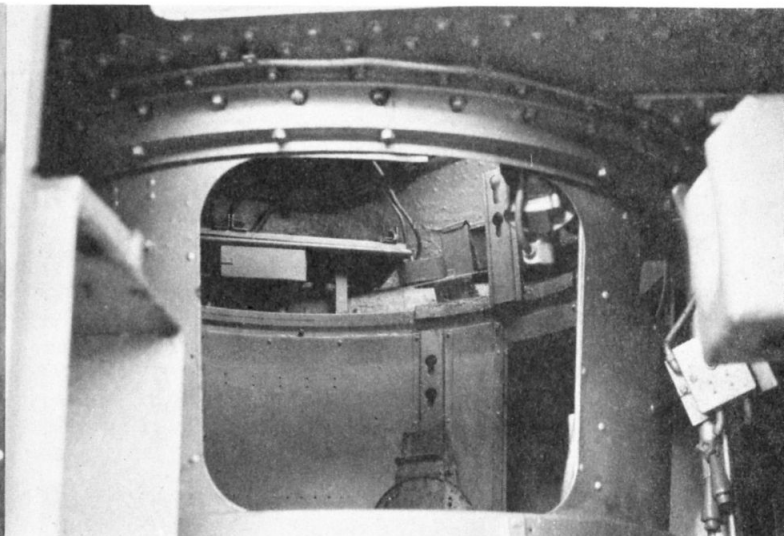
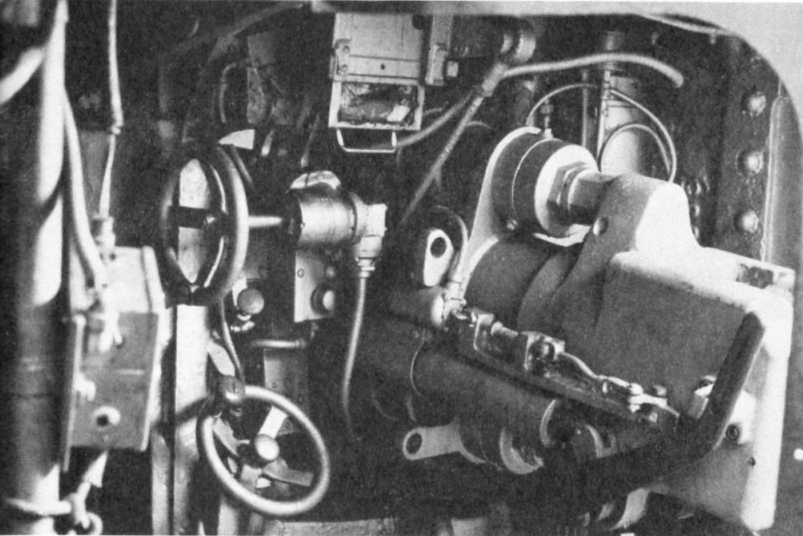






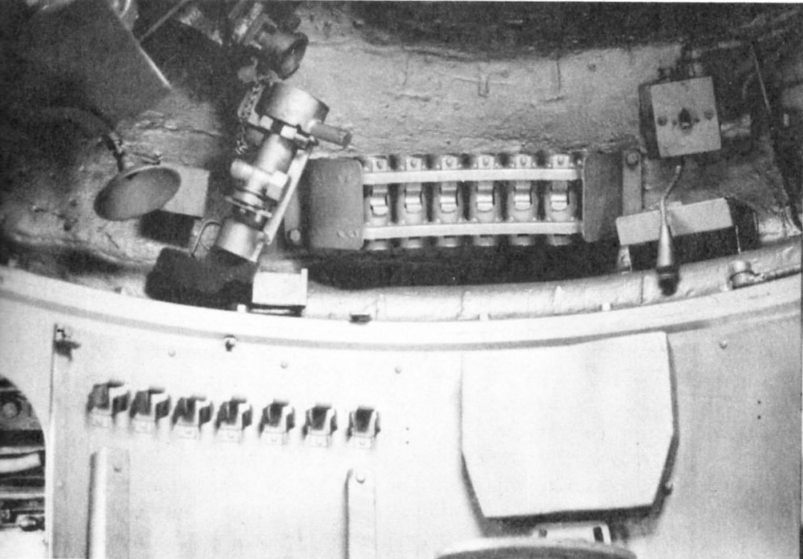
*Above, left:* Another view of the Commander's hatch, this time in the open position. Note the light color interior paint. *Above, right:* This photo shows the Driver's position in the Grant. Note

the edge of the seat (at lower right), the twin control sticks, and the clutch pedal. At the top of the picture on the right is the Driver's vision port and its support.



*Above, left:* This photo shows the breech and Gunner's controls for the sponson-mounted 75mm gun. Note the breech opening crank at the lower right of the picture. *Above, right:* A view of

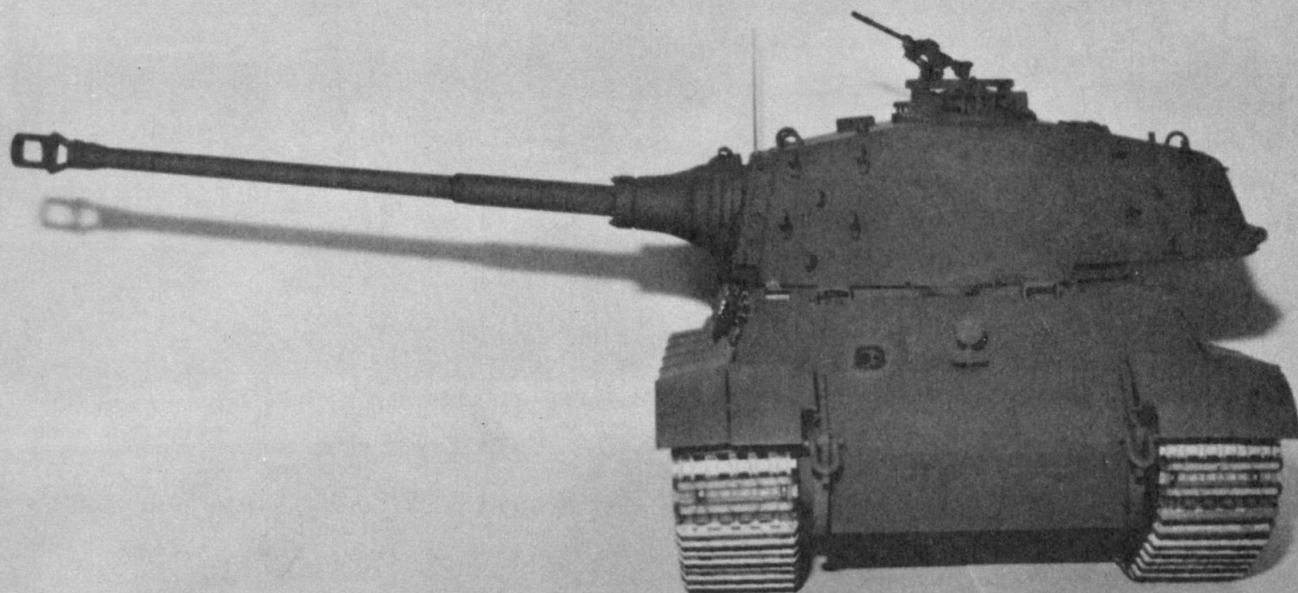
the turret basket for the 37mm turret, showing the openings for crew entrance and exit. Note the fold down seat for the Commander inside the turret.



*Above, left:* This photo shows the interior of the 37mm gun turret, illustrating ammunition holding clips, seat, 2-inch smoke mortar (in the open position) and the inter-communications

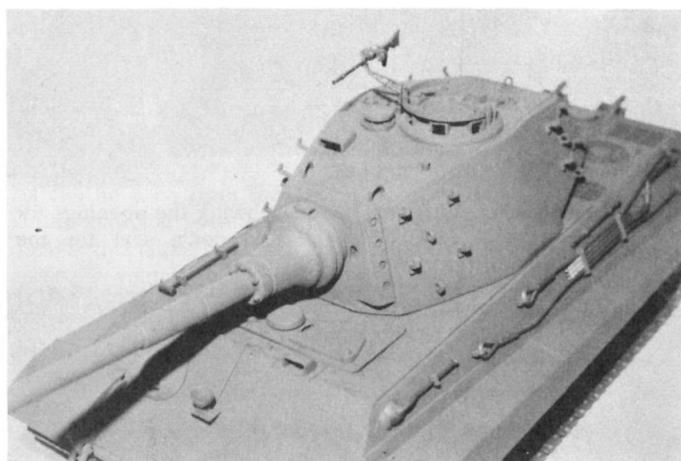
headset connectors. This view shows the right wall of the turret. *Above, right:* Interior of the 37mm gun mantlet, with the gun removed. Note the sighting periscope at left.

# SCRATCHBUILDING A HENSCHEL TURRET FOR BANDAI'S



## KING TIGER

by Larry Provo



Many of you may have purchased Bandai's kit of the German 'King Tiger'; if so, you'll probably agree with me that it is one of that company's finest efforts. However, the AFV enthusiast may well be disappointed to find that this particular model incorporates the Porsche type of turret, rather than the more commonly found Henschel (or Production) turret. A good many modelers who would think nothing of trying to remedy such a defect in 1:76th or 1:48th scales will blanch at the thought of touching a knife to their new 1:24th scale \$26 beauty. Obviously, creating a certain effect in 1:24th scale will require considerably more acumen and caution than similar work in the smaller scales, yet this should not be used as an excuse to accept something that is less than satisfactory to the builder. The following article is an outline of a turret conversion designed especially for the Bandai 'King Tiger' kit.

The Porsche turret was constructed specifically for a new

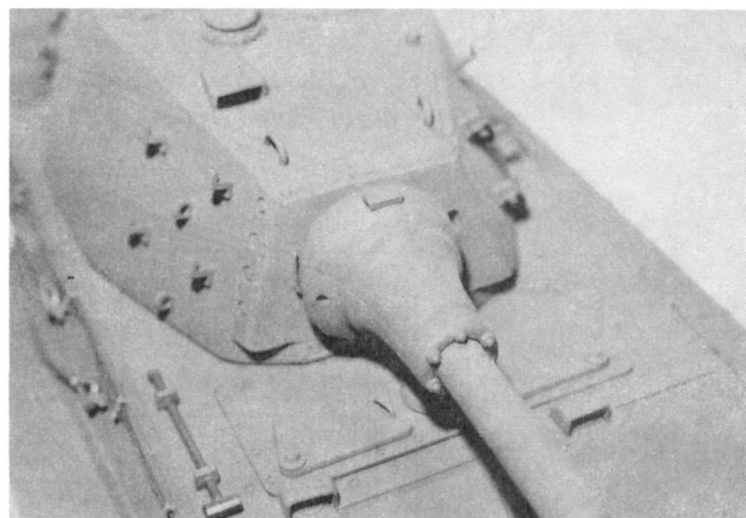
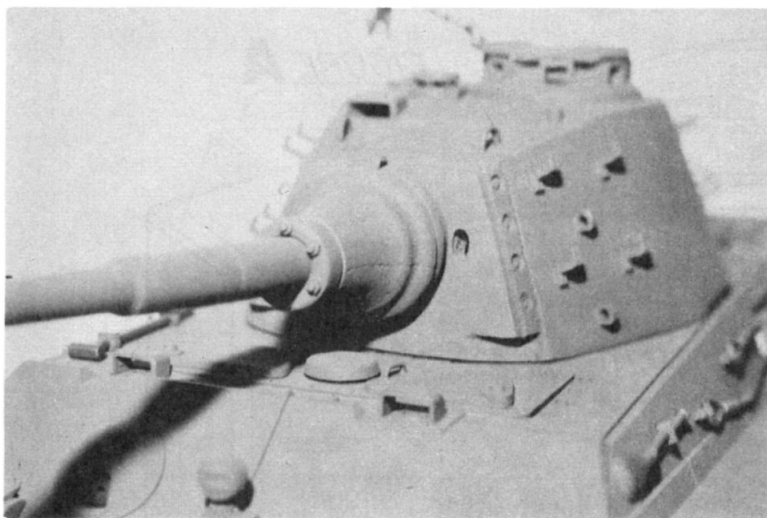
design of tank designated as the 'Type 180'. When, however, the Henschel firm put forward plans for the vehicle which eventually became known as the *Königstiger*, the Type 180 was rejected - but not before fifty turrets for this model had been completed. These Porsche turrets, now surplus, were utilized on the first fifty of the *Tiger, Ausführung B* tanks to be completed. All subsequent 'King Tigers', over four hundred in all, used the Henschel-designed turret which featured a new configuration, redesigned gun mantlet, repositioned cupola and several other modifications. Although the Henschel design was intended primarily to simplify production, it actually possessed increased armor protection while at the same time doing away with a built-in shot trap found under the mantlet of the Porsche designed turret.

I can't title this article: *'The Production Turret Made Easy'*, by Larry Provo, because the work involves quite a challenge. However, I shall try to make it as simple as I possibly can for the information of those modelers who might be interested....

Fortunately, the Porsche-type turret in the Bandai kit can be salvaged almost 100%, with the interior fixtures adapting very easily to the production turret conversion - as well as the better part of the Porsche turret exterior. The material used on the front, rear and bottom portion of the new turret is 1/4-inch stock. The sides and top of the turret can be, and should be made of a much lighter plastic due to the shaping required.

The accompanying diagrams should greatly facilitate the work involved. *Figure A* shows the top of the turret, and is pretty much self-explanatory. The turret top is horizontal, with the front sloping at 10° and the rear portion sloping at 15°.





The pattern that has been laid-out for the side armor is by-far the easiest means of performing the construction. The same pattern is, of course, followed on both turret sides. The vertical lines in the drawing represent points for bending and shaping the side armor. I advise saving this shaping for last, and first trying it with a piece of cardboard or scrap plastic in order to practice obtaining the correct shape. This procedure will save both time and money.

The front portion of the turret is made from a single piece of plastic with a  $\frac{3}{4}$ -inch hole set just slightly above center. A ball mount covers this hole; the ball mount has an elongated hole large enough to accept the gun, the oval shape of this hole allows the main gun to elevate and depress. To the right of the ball mount is a vertical slot for the gunner's sight, while to the left is the machine gun opening, which has a semi-horseshoe shaped shield as shown in *Figures B and F*.

The 'Pig Head' mantlet or gun shield appears to be off-center in the diagram... and so it is. However, the gun itself sits directly on the centerline. This shield is constructed in three sections as illustrated in *Figures E and F*. Number 1 is a perfect circle; Number 2 is made from the top portion of a medicine bottle cemented to the back of piece #1 and cut to the shape indicated in the drawings; and Number 3 is a piece of plastic tubing having an inside diameter of  $\frac{5}{16}$ -inch. Cement the tubing to the front, off-center as indicated, and then fill the surrounding sides with putty and shape. After the mantlet has been constructed, counter-bore the back (again, off-center) to fit the ball mount comfortably.

The Henschel gun was a two-piece 88mm, rather than the single-piece in the kit, and the kit gun will have to be altered to obtain the proper length. To perform this conversion, cut a

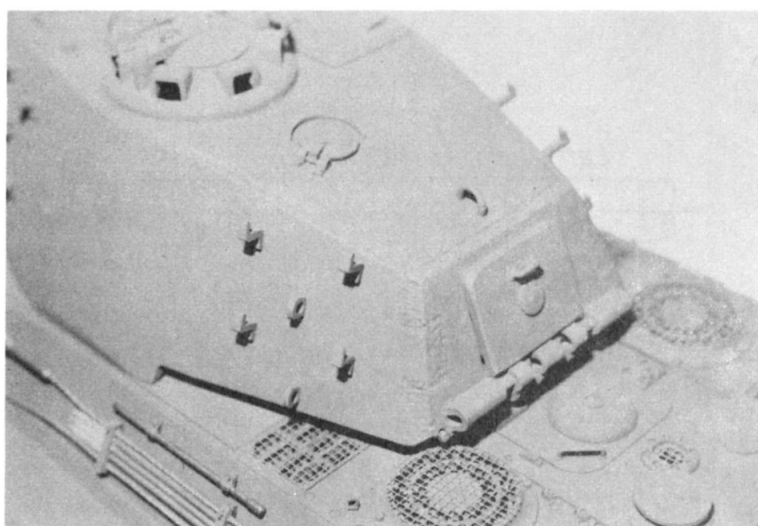
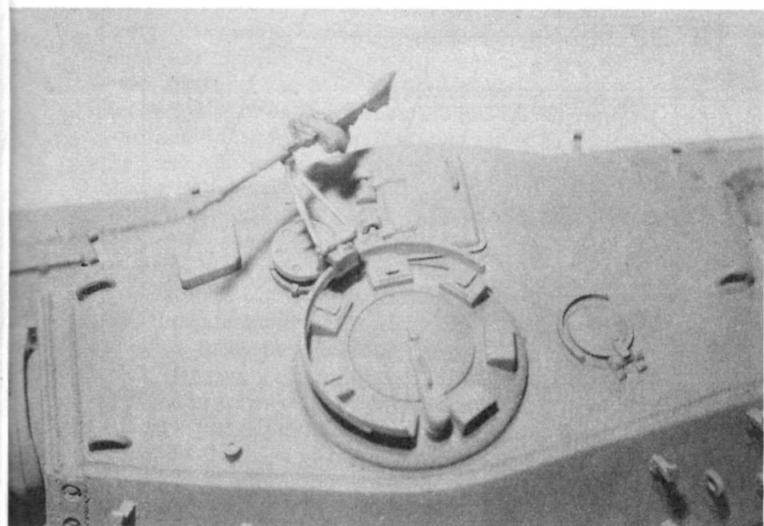
$2\frac{1}{2}$ -inch length of the  $\frac{5}{16}$ -inch tubing, insert this piece into your drill, and lathe out the bands in the exterior of the barrel. After you've assembled the gun from the kit, cut off its secondary piece and substitute the barrel piece that you've made from the tubing. You should have about  $\frac{1}{2}$ -inch of length oversize to insert into the gun shield.

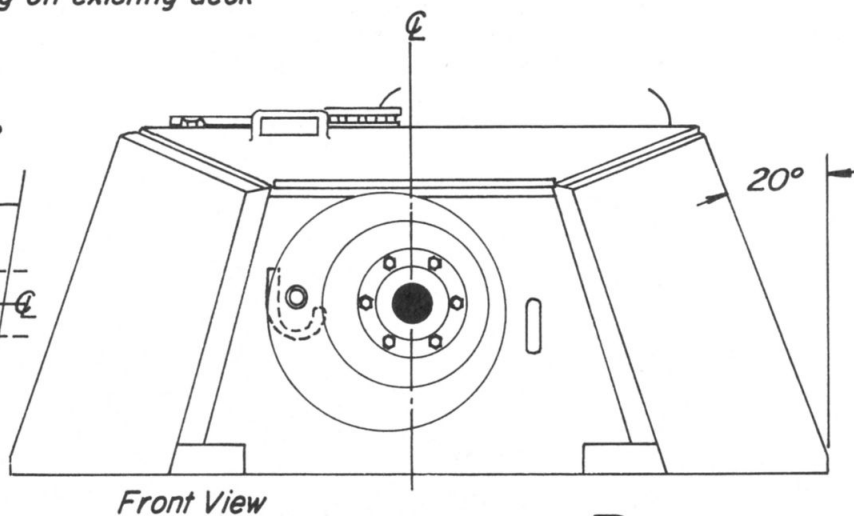
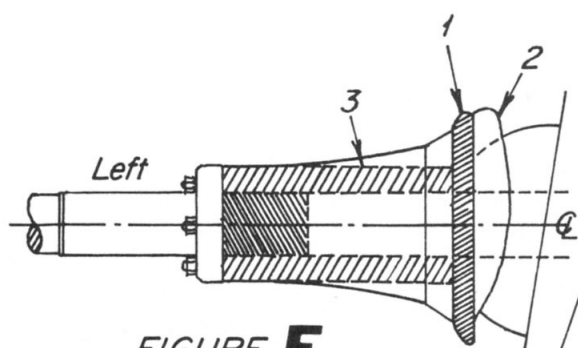
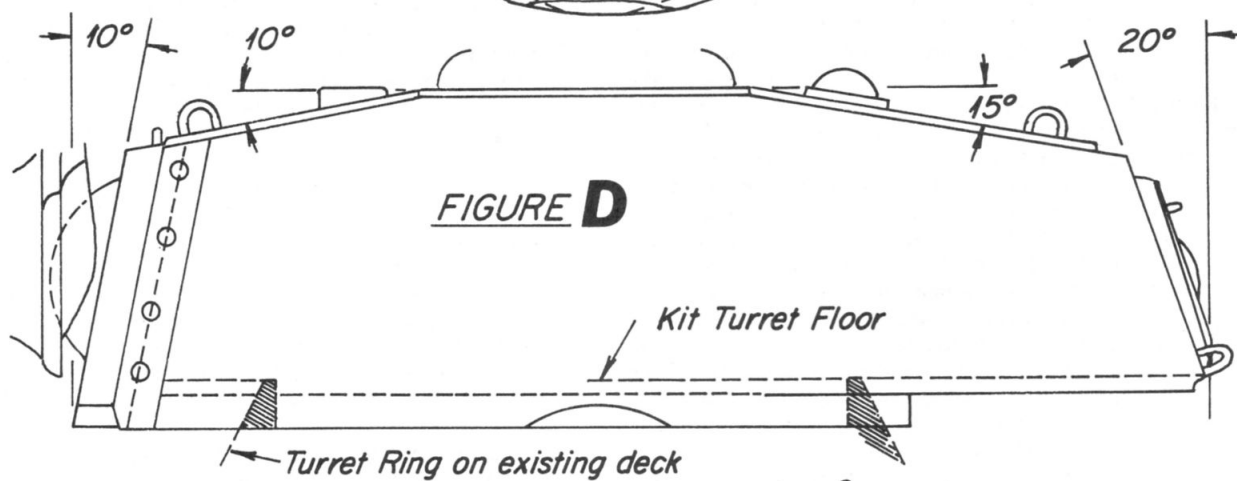
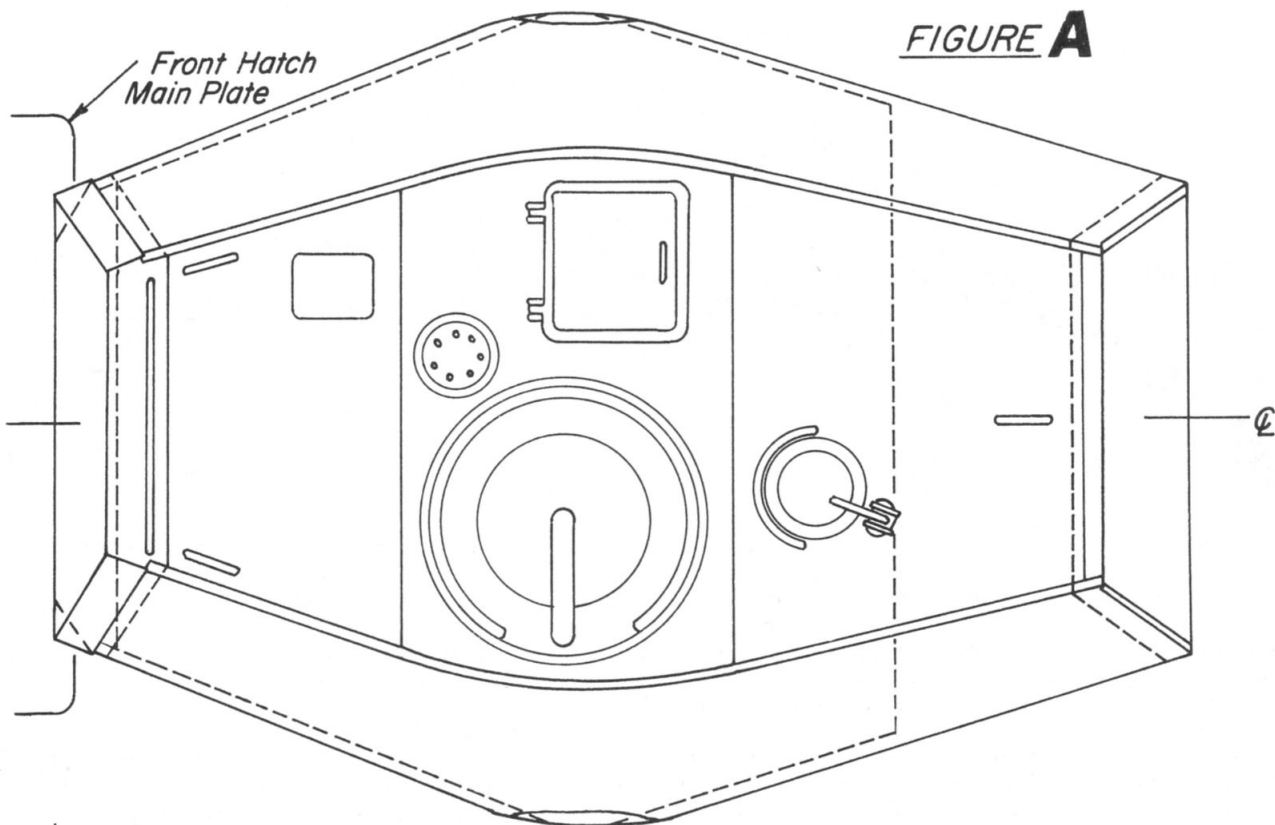
The original Porsche turret tended to stand a little high, so when its flooring was incorporated into the Henschel designed turret, the gun had to be jacked-up by 12-inch blocks. This is a step you will have to take as well... to scale, of course. In addition, the gun must be moved rearward  $\frac{1}{8}$ -inch since the front of the production turret was not quite as long as the Porsche turret, even with the ball mounting. Moving the gun will permit the gun mount to fit comfortably into the ball mount, although it will be necessary to add another small length of the  $\frac{5}{16}$ -inch tubing to the gun in order to reach the gun shield.

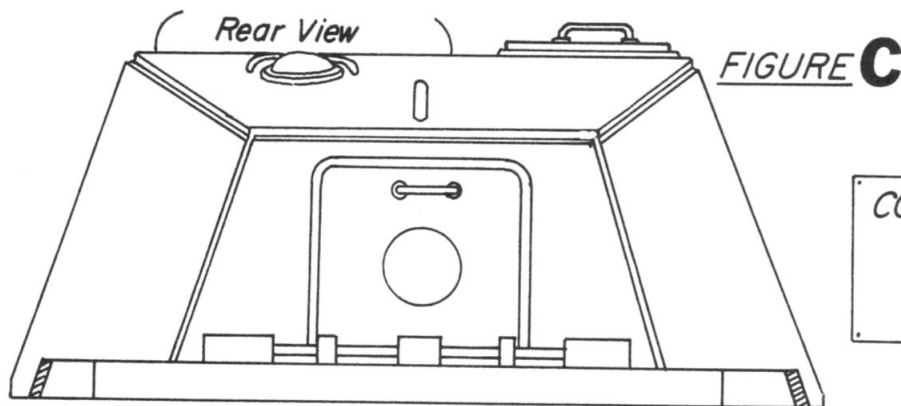
The  $\frac{1}{4}$ -inch floor will have to be drilled out to fit the existing turret ring. After this, the Porsche floor can be cemented to the top of the scratchbuild flooring. *Figure D* shows how this is done.

The rear of the turret assembly is a fairly simple job. Using the hinge from the kit, cut off the upper portion with the bolt pattern. Cut a doorway large enough for the Porsche door to fall through it, then scratchbuild the Henschel type pictured and cement it atop the Porsche door in order to guarantee a perfect fit. The pin or bar that runs along the bottom of the door is meant to fit flush to the rear, and this requires that a small groove be cut for the pin to sit in.

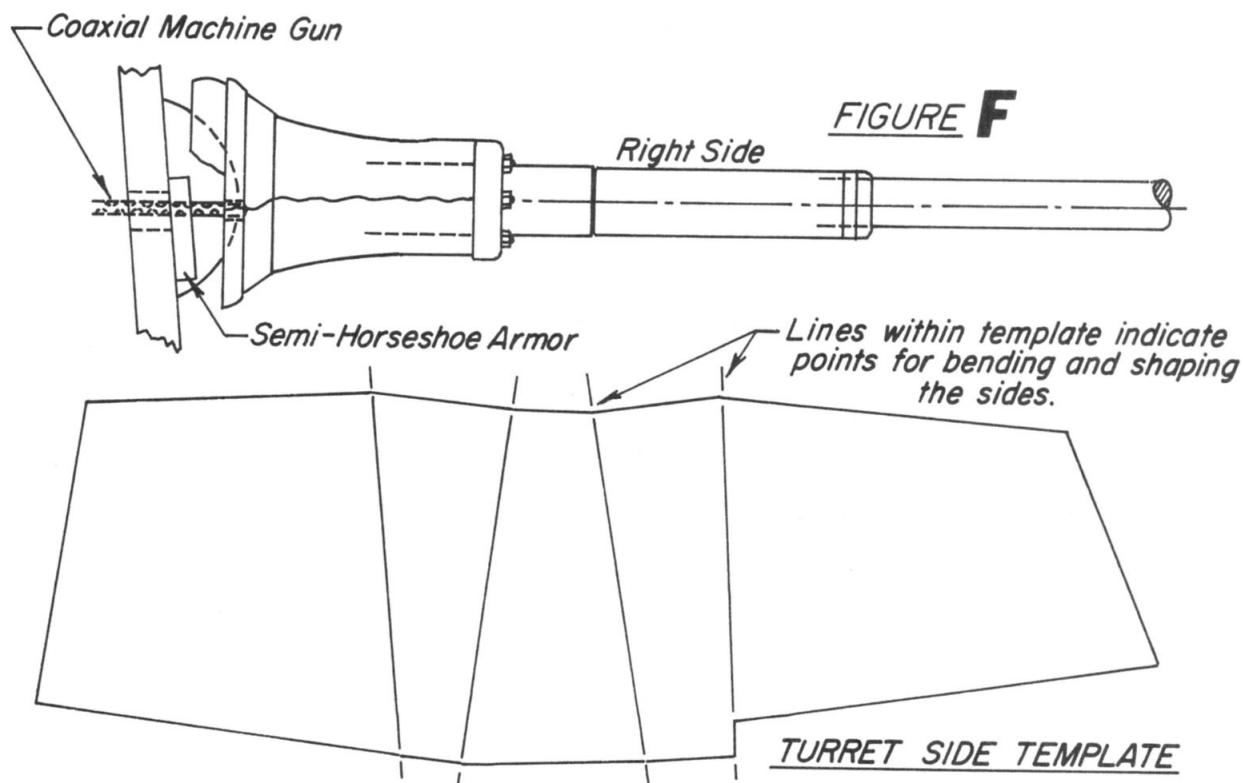
At this stage, you can add the remainder of the interior, which should fit your new turret assembly perfectly.





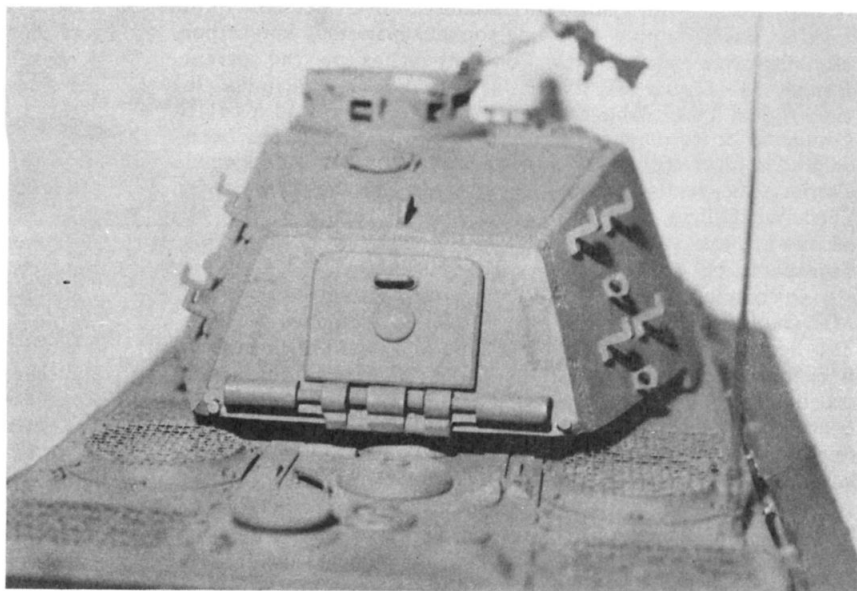


CONVERSION DRAWINGS  
& TEMPLATES  
FOR BANDAI'S 1:24th  
SCALE 'KING TIGER'



I have found that the *Dremel* Moto-Tool is an excellent means for simulating the weld lines found on the original vehicle. Just run the tool along the seam where two parts join, or anywhere else that you would want to show a weld line, and you'll be amazed at the results. For welds such as those seen around the turret, you should first run a small bead of putty around the base where the weld should be. This can be accomplished with a glue gun and a little pre-mixed spackling paste. Once the paste has set, run your router attachment around the turret base to give the weld effect.

The rest of the modifications are up to you. Add the remainder of the exterior detailing and you will have the Henschel turret. The spare track hangers are an option, since the early production turrets didn't carry them. The use of this new turret assembly on your *Bandai* model will show the 'King Tiger' in the form in which it was most commonly encountered.





# THE U.S. ARMY MECHANIZED RIFLE COMPANY

by PETER FORDYCE & JAMES STEUARD

The present-day U.S. Army *Mechanized Rifle Company* is organized under Table of Organization and Equipment (TO&E) 7-47H, dated 30 November 1970. The basic TO&E has been modified by a number of changes (at present, #9 is in effect) and the organization charts on the following pages show the company in its most current form, updated by a 'Basis of Issue' (BOI) document which allocates the newly-issued 'Dragon' and 'TOW' anti-tank missile systems. In fact, many U.S. Army mechanized rifle units will not yet be organized as shown here, due to the lack of the two missile systems.

TO&E 7-47H provides for two different types of *Mechanized Rifle Companies*, organized differently due to different weapons being available. The first organization, identified as SRC 010, is formed around the 90mm recoilless rifle; while the second type of unit, identified as SRC 020, utilizes both the 90mm and the 106mm recoilless rifles. The charts on the following pages illustrate this second type of organization, modified with the two missile systems replacing the recoilless rifles in their entirety.

The SRC 010 *Mechanized Rifle Company* (equipped with 90mm recoilless rifles) has Rifle Platoons with four Squads, instead of the three squad Platoons shown opposite. The fourth Squad rides in its own M113 Personnel Carrier and is armed as a 'Weapons Squad' with two 7.62mm M60 machine guns and two 90mm Recoilless Rifles. The Rifle Platoon Headquarters personnel do not have their own M113, but are instead distributed throughout the other platoon vehicles. The Rifle Company's Fourth Platoon is designated as a 'Mortar Platoon', and differs from the 'Weapons Platoon' shown opposite in that it lacks the Anti-Tank Section of two vehicles. Instead, it only has the three Mortar Squads (each equipped with one 81mm mortar carried in an M125A1 Carrier), and a Platoon Headquarters of two vehicles.

As the version of the *Mechanized Rifle Company* which is equipped with the 106mm Recoilless Rifle or the 'TOW' is the most modern and common variant, it is the one described here in full detail. The Company consists of 6 officers, 48 non-commissioned officers and 115 enlisted men. For weapons, the Company is equipped with 139 rifles (of the 5.56mm M16 type), 33 pistols, 23 sub-machine guns, 24 M203 Grenade Launchers (which mount on M16 rifles), 15 light machine guns and 1 heavy .50 caliber machine gun. In terms of heavy weapons, the Company has 9 'Dragon' Missile Launchers, 2 'TOW' Launchers and 3 81mm Mortars.

The Company Headquarters Section is a small tactical headquarters, with sufficient administrative personnel to handle basic supply and personnel matters. For other administrative support, the Company relies on the parent Battalion Headquarters, as well as Adjutant General units. In the original TO&E, the Company Commander crewed a M114 Command & Reconnaissance Vehicle, however, this has been deleted in favor of the more reliable and roomy M113 Personnel Carrier. The section's only Jeep is used by the Company's Executive Officer, who, in addition to his regular duties as second-in-command, also serves as the Company's Motor (or Transportation) Officer.

In common with most U.S. Army company-level units, the *Mechanized Rifle Company* has its own Maintenance Section. This section is equipped for evacuation and repair of the unit's vehicles under combat conditions. There have been a number of recent changes in vehicular equipment in the Maintenance Section, mainly to permit better off-road mobility. The Motor Sergeant originally rode in a ¾-ton truck, which pulled a ½-ton cargo trailer. Both of these have been replaced by one 1¼-ton M561 'Gama Goat' (which offers greater mobility and capacity). The main personnel of the section are transported in one M35A1 2½-ton truck, which originally towed a 1½-ton trailer.

This trailer has now been deleted in the most recent change. The recovery vehicle of the section remains an M578, which is crewed by two recovery specialists.

Each of the three Rifle Platoons is identical in structure, equipped with four M113 Armored Personnel Carriers and three Rifle Squads. Each Rifle Squad consists of eleven men organized into two Fire Teams under the command of Sergeants. One team has four men and the second has five. In addition to the squad's personal weapons, there is one 7.62mm M60 machine gun available to the squad. This weapon provides suppressive fire on enemy positions during the mounted attack, and can also be used to supplement the squad's defensive fires when dismounted. The Rifle Squads' Personnel Carriers (as well as other company M113's) mount a cupola .50 caliber machine gun. During the march, this weapon is crewed by the Squad Leader and is used to provide suppressive fires as needed during the attack. At a halt when the Squad Leader is usually dismounted, the Personnel Carrier Driver mans this weapon so that its firepower is available. The Rifle Platoon Headquarters rides in the platoon's fourth M113, which also transports two extra 7.62mm M60 machine guns and the platoon's three 'Dragon' missile launchers. The two extra machine guns are normally mounted on the Headquarters M113 to provide extra suppressive fire during the attack; however, during defensive engagements they may be employed at the discretion of the Platoon Leader, who may distribute them to the squads. The three 'Dragons' replace the 90mm recoilless rifles, and are assigned to qualified squad personnel for use during defensive situations. The 'Dragon' has approximately the same range as the 90mm gun, but it is highly effective since the missile can be steered onto its target by the gunner.

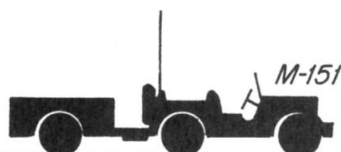
The Fourth Platoon is designated as the 'Weapons' Platoon and it is organized with a Headquarters and two Sections. The Weapons Platoon Headquarters rides in one M151 ¼-ton truck, which tows a ¼-ton trailer carrying extra ammunition. The first section employs 81mm mortars which are fired from M125A1 Mortar Carriers (a modified form of the basic M113 Personnel Carrier). The Mortar Section Headquarters uses one M113 to carry the Fire Direction Center personnel and the Forward Observers. There are three Mortar Squads in the Section. The platoon's second section is the major anti-tank element of the Company. Originally, this section was equipped with two ¼-ton trucks, each mounting a 106mm recoilless rifle and towing an ammunition trailer. Under the latest BOI change, each M151 Jeep in the section has been replaced by an M113 Personnel Carrier mounting a 'TOW' Missile Launcher on the vehicle roof. For a photo of this weapons system, see *AFV-G2*, Volume 4, Number 12, Page 25. It appears that there have been no personnel changes in the Anti-Tank Squads, except for a change in the personal weapon for the two Drivers. Originally, the ¼-ton truck drivers carried a 5.56mm rifle, but it is surmized that this has been altered to one pistol and one sub-machine gun per driver (as these are normal weapons for a Personnel Carrier driver). The Anti-Tank Section Leader rides with one of the squads in the section, or may ride in the Platoon Leader's Jeep. The advent of the 'TOW' Missile Launcher has added a new dimension to the company's ability to function in a hostile tank environment. Like the 106mm recoilless rifle which it replaces, the *TOW* has a revealing backblast (currently known as the weapon's 'signature') which does disclose the weapon's position to enemy observers. However, the *TOW* missile is highly effective against all forms of armored vehicles, it can be steered during flight to follow an evasive target, and in the hands of experienced gunners, it practically guarantees a first round kill of enemy tanks which come into range of the weapon. The *TOW* Launcher may be dismounted from the

Continued on Page 41

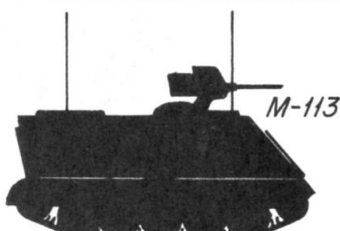
# U.S. ARMY MECHANIZED RIFLE COMPANY

TO & E 7-47H (Modified)

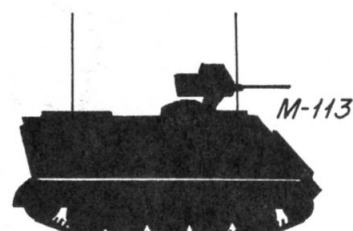
## COMPANY HEADQUARTERS



- 1 LT. Executive Off. (R)
- 1 PFC Radio Operator-Driver (R)



- 1 1SG First Sergeant (R)
- 1 SSG Commo Chief (R)
- 1 SP4 Armorer (R)
- 1 SP4 Personnel Carrier Driver (SMG, P)

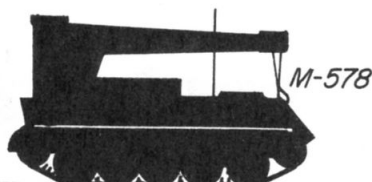


- 1 CPT Company Commander (P)
- 1 SP4 Personnel Carrier Driver (SMG, P)

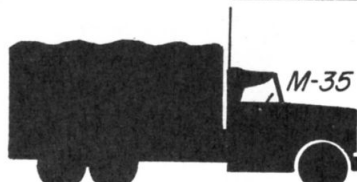


- 1 SSG Supply Sergeant (R)
- 1 SP5 Unit Clerk-Driver (R)
- 1 PFC Supply Clerk (R)

## MAINTENANCE SECTION



- 1 SP5 Sr. Recovery Vehicle Operator (P, SMG)
- 1 SP4 Recovery Vehicle Operator (P, SMG)

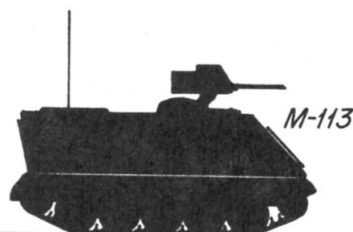


- 1 SP5 Sr. Track Vehicle Mechanic (R)
- 4 SP4 Track Vehicle Mech.(R)
- 1 SP4 Equip. Maint. Clerk-Driver (R)
- 1 SP4 Field Radio Mech.(R)



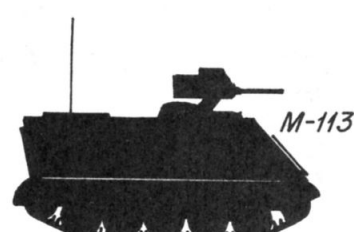
- 1 PSG Motor Sergeant (R)
- 1 PFC Track Vehicle Mech. Helper-Driver (R)

## FIRST RIFLE PLATOON



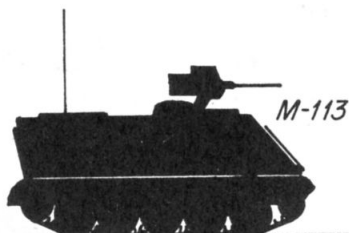
- 1 SSG 1st Squad Leader (R)
- 2 SGT Team Leaders (R)
- 2 SP4 Auto Riflemen (R)
- 2 SP4 Grenadiers (R, GL)
- 1 SP4 Personnel Carrier Driver (P, SMG)
- 3 PFC Riflemen (R)

1 - 7.62mm M60 MG

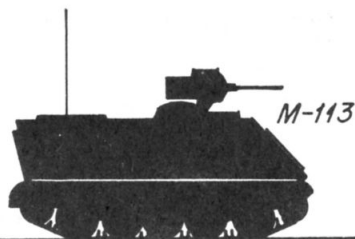


- 1 LT Platoon Leader (R)
- 1 PSG Platoon Sergeant (R)
- 1 SSG Asst. Platoon Sgt.(R)
- 1 SP4 Personnel Carrier Driver (P, SMG)
- 1 PFC Radio Operator (R)

2- 7.62mm M60 MG's  
3- "Dragon" AT Systems \*



1 SSG Squad Leader (R)  
 2 SGT Team Leaders (R)  
 2 SP4 Auto Riflemen (R)  
 2 SP4 Grenadiers (R, GL)  
 1 SP4 Personnel Carrier  
     Driver (P, SMG)  
 3 PFC Riflemen (R)  
 1 - 7.62mm M60 MG



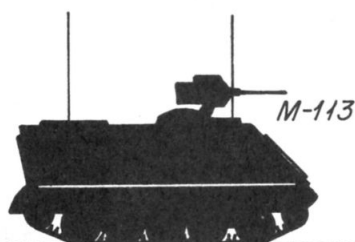
1 SSG Squad Leader (R)  
 2 SGT Team Leaders (R)  
 2 SP4 Auto Riflemen (R)  
 2 SP4 Grenadiers (R, GL)  
 1 SP4 Personnel Carrier  
     Driver (P, SMG)  
 3 PFC Riflemen (R)  
 1 - 7.62mm M60 MG

SECOND and THIRD RIFLE PLATOONS are identical to the FIRST RIFLE PLATOON.

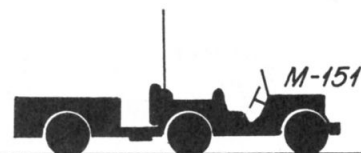
#### FOURTH WEAPONS PLATOON



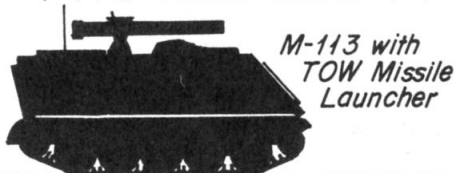
1 SGT 1st Mortar Squad Ldr. (R)  
 1 SP4 Gunner (P)  
 1 SP4 Mortar Carrier Driver  
     (P, SMG)  
 1 PFC Assistant Gunner (P)  
 1 PFC Ammo Bearer (R)



1 SSG Mortar Section Ldr. (R)  
 3 SGT Forward Observers (R)  
 2 SP5 Fire Dir. Computermen (R)  
 1 SP4 Personnel Carrier  
     Driver (P, SMG)  
 2 PFC Radio Operators (R)



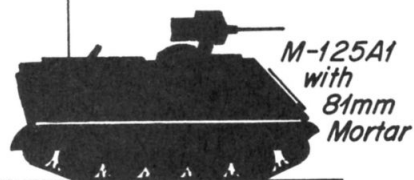
1 LT Platoon Leader (R)  
 1 PSG Platoon Sergeant (R)  
 1 PFC Radio Operator-  
     Driver (R)



1 SSG AT Section Leader (R)  
 1 SGT AT Squad Leader (R)  
 1 SP4 Gunner (P)  
 1 PFC Ammo Bearer - \*\*  
     Carrier Driver (P, SMG)  
 1 PFC Assistant Gunner (P)



1 SGT 3d Mortar Squad Ldr. (R)  
 1 SP4 Gunner (P)  
 1 SP4 Carrier Driver (P, SMG)  
 1 PFC Assistant Gunner (P)  
 1 PFC Ammo Bearer (R)



1 SGT 2d Mortar Sqd. Ldr. (R)  
 1 SP4 Gunner (P)  
 1 SP4 Carrier Driver (P, SMG)  
 1 PFC Assistant Gunner (P)  
 1 PFC Ammo Bearer (R)



1 SGT AT Squad Leader (R)  
 1 SP4 Gunner (P)  
 1 PFC Ammo Bearer-Carrier  
     Driver (P, SMG) \*\*  
 1 PFC Assistant Gunner (P)

**Notes:** \* "Dragon" AT Weapons may be distributed through Rifle Platoon(s) at the discretion of Platoon Leader(s).  
 \*\* Weapons are surmized from the assignment of M-113 s to the modified TOW-equipped Anti-tank Section. See text for additional comments.



# One Person's Approach to: Weathering Armor Models

BY RICHARD WERNER

In response to absolutely no one, I have agreed to write an article on weathering of armor for the Final Approach. The actual stimulus to write this 'blurb' came from an article on armor weathering appearing in the June 1974 issue of 'Scale Modeler' magazine. You can imagine the pangs of excitement that coursed through my 'tank-nut's' heart when I saw on the front cover, 'How To: The Art of Armor Weathering'... With trembling fingers, rapid pulse and irregular breathing, I turned to page 44. When what to my wondering eyes should appear by ten photographs (in black and white), that more-or-less proved that the author could weather armor, and little more than a page of written text that went a long way toward proving that he couldn't tell anyone else how to do it! Despite my advancing years, I am admittedly a relative novice at modeling. However, after one full year of lumps, bumps, bruises and shattering blows to my ego, I finally received a 'not bad, not bad at all' from our beloved editor. That alone would make me brave enough to tell Georgie Patton that his tanks didn't look real, or at least presumptuous enough to tell other modelers how to finish off armor models. So, with a dirty mind in a dirty body, here we go....

The basic materials needed to weather armor include silver 'Rub 'n Buff' and various paints and pastels. In my case, I prefer Polly S paint for a variety of reasons, not the least of which is the cheap, easy availability of its solvent (water). It seems logical to me to weather a vehicle in layers from the inside out. Before weathering, of course, the model must be completed. This includes assembly, conversions, bent fenders, etc., and a 'mint condition' paint job. It's a good idea to leave off the tracks until most of the weathering is completed. This facilitates weathering of undersides of fenders, road wheels and drive units, and the tracks themselves. The first step is the application of 'Rub 'n Buff' to worn areas (hatch edges, tow hooks, lift rings, hand holds, tools, track guide teeth, and ground contact points, final drive teeth, and anywhere else you can think of that might get worn, scuffed or bashed). This should be done gently with a small amount on the tip of your index finger. Too much and you'll end up with a silver-painted tank. The track guide teeth and contact areas can be painted with a brush after thinning the 'Rub 'n Buff' with turpentine. It goes without saying that you don't apply 'Rub 'n Buff' to rubber track blocks. Next comes rust. A mixture of Polly S PF65 Military Medium Brown (2 parts) and PF24 International Orange (1 part) produces a color identical to Railroad Colors Rust. The parts that get rusted most heavily on a tank are the exhaust system and the non-contact metal portions of the tracks. Other rusty areas include tools, scraped areas, hinges, spare tracks and jerry cans. For heavy rust, straight paint can be brushed or scrubbed on; for light rust, the paint should be thinned and washed on. Don't worry about getting rust on adjacent structures, real rust will do just that. These two steps complete the more-or-less permanent weathering -- areas that can't be cleaned (on the real vehicle) short of sanding and repainting. But let us not stop short of complete filth....

Armor accumulates a lot of soot, grime, grease, oil and gasoline spills. Soot can be applied to the end of a cannon barrel and exhaust system with good old black, using the dry brush technique. The rest of the crud can be simulated with a complete wash of dilute black. I've found that a good dilution results if you coat the inside of an empty paint bottle with black paint, and then fill up the bottle with water (or whatever thinner applies to the type of paint you use). This dilution is then washed over the entire vehicle with heavy concentration or puddling on the rear deck, around gas caps, around the final drive and road wheel units, and around engine and transmission access hatches. The grease, oil and gasoline stained areas may require several applications, with drying in

between the coats of wash.

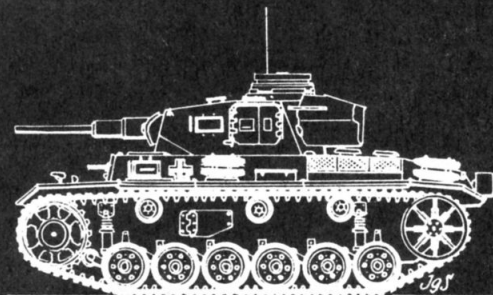
The next two steps consist of washes, first with dilute Dark Earth (PCE 76 or PCF 81) and then Sahara Sand (PF 62). These dilutions are made in the same manner as the black wash. Both dark earth paints are aircraft camouflage colors and are distinctly more tan than brown. These are washed on more lightly than the black, and can be faintly streaked on vertical and angled surfaces. Small puddles can be left where dirty feet might hit the tank (glacis plate, hull top, turret sides and top, etc.). Very little if any should be applied to the rear deck.

Now we are ready to put on the mud and dirt that is thrown, splashed or blown on the vehicle. This is done in two steps, using Dark Earth and Sahara Sand at full strength. The Dark Earth should be applied fairly heavily where dirt and mud is thrown on the tank by the tracks and road wheels (fenders, hull sides, lateral aspects of glacis and rear of hull). Use a straight tipped brush. The technique I use is to put some paint on a flat surface and dip the brush lightly into the paint. The brush is then blotted on paper toweling to remove most of the paint. The paint is applied to the tank with a crude, heavy-handed stippling motion. The higher up on the tank that I go, the less paint I leave on the brush. By the time I get to the turret top, I scrub with a virtually dry brush. Again, put paint where dirty feet would go, and go very lightly, if at all, on the rear deck. If you want mud around the tracks and road wheels, you can thicken the paint by controlled evaporation (leave the lid off) or by adding talc or shaved soft pastels. This works with Polly S paints, but I'm not sure if it will with other paints. The Sahara Sand is applied very, very lightly with an almost dry brush. This will only hit high points to accentuate them. You now have a vehicle that only a mother (or a modeler) could love. In the past, I stopped here, but there are two final steps that will produce a piece of armor that only a modeler could love.

Shaved soft pastels, applied with a soft brush, produce a dull matte effect that accentuates the sooty and rusty areas. You can also use pastels to simulate dust, however, I have a better suggestion that I'll mention in a few lines. You can buy a box assortment of soft pastels at most stationery, art supply and hobby shops. They range from several dollars to over \$30, depending upon how involved the set is. However, I find that I only use tans, browns, orange, red brown and black with any frequency. You can buy individual pastels at some art stores for 40 to 80 cents a stick. The pastel is shaved onto a flat surface and applied to the model with a clean, soft brush. The excess pastel powder is blown or brushed off. Once it's brushed on, it won't come off unless you get your sweaty fingers on the model. Now for the final dusting (bet you thought I was going to make a career out of writing this article). What could be better at simulating dust than dust itself? For this purpose, I use a fine, powdery dirt - the kit you get when you sweep your garage floor. One sweeping will get you enough dust to last several years (I don't mean that you shouldn't sweep your garage, just don't save the dust). When you sweep, you can also pick up small pebbles, bits of leaves, twigs, etc. These can be removed for the most part by sifting the dirt gently through an orange or tea strainer (for gosh sake, they're cheap - buy one - don't use your wife's). The dust is applied to the model with an old brush, using a gentle scrubbing action followed by blowing off the excess. This produces a nice dusty effect, but don't be too heavy-handed. You don't want to completely obliterate all your other work.

That's the technique... I hope that somewhere in all of this, there will be something to help someone achieve a better final result. At least I hope it doesn't end up as the old Marine Corps 'Sarge' once said, 'I taught dese guys all I know, and dey still don't know nuthin'.

# ARMOR MODELS IN REVIEW



Tamiya's **Russian T34/76 Medium Tank** in 1:35th Scale....

Reviewed by Duane Thomas

Just as the last issue was going through its press runs, the subject of this review arrived from Japan. It is the long-awaited 1:35th scale rendition of the Soviet T34/76 Medium Tank, circa 1942. The kit is molded in a finely detailed, semi-gloss, dark olive green plastic. Flash is minimal and the amount of surface detail is amazing. All scale measurements that I was able to check against the real vehicle show that the model is an accurate 1:35th scale. As with virtually all of Tamiya's kits, the outer surfaces are finely textured to resemble cast armor. The amount of interior detail in this kit is not extremely comprehensive. No engine or transmission is provided; however, adequate detailing has been done to the inside of the turret. The main gun breach is well done, and there are two seats provided, one for the commander and one for the gunner. The large roof hatch may be cemented in the open position, but this will tend to reveal the lack of detail in the lower hull, unless the view is blocked with the figure of the commander.

In terms of hull construction, there are two basic problem areas in this model. First, the kit has Tamiya's typical fittings for motorization. This means plugging and filling a slot and a number of holes in the hull bottom; this is easily done with 'Green Stuff', however, I remain one of the minority who thinks that these holes detract from the kit. A second problem exists when the upper and lower hull pieces are cemented together. There are no plates to fill the gaps between these parts. This is unfortunate, as quite a visible gap is evident, even in the finished model. The gaps could well have been eliminated in the molding design, by including side pieces on the lower hull. Readers can fill these gaps by adding the side pieces from .010 sheet styrene, cutting these pieces to fit into the bottom of the fenders. Turret construction in this model has been well thought out in that all seams are hidden behind applique pieces of plastic. The roof piece nicely fits into the two side pieces; in fact, the whole turret assembles so easily that it's a ten minute task to assemble everything.

Some very nice features of the kit are evident when one notices the amount of extra detail provided for realism. In the hull itself, the fenders are molded to show irregular dents and sag to represent sheet metal which has been flattened or bent by numerous feet. Likewise, the three spare fuel drums are bent and battered, nicely representing drums which have seen hard wear. If you don't want to include these round fuel drums, the kit includes two of the rectangular rear fuel containers commonly seen on early T34's. The kit includes three sets of alternate road wheels which depict the late, solid-steel, 10-hole style of wheel. These can be substituted for the early-style smoothly dished wheels provided in the kit, so as to represent wheels replaced due to wear or combat damage. In addition, there's an applique armor plate for the hull front, two rolled tarps, a pair of wooden boxes, ice-gripper track plates, a pair of shovels and a pair of wooden unditching beams. The tow

ropes are separately cast as straight length of wire, complete with end shackles. These may be individually shaped to the desired curves using a localized heat source to carefully soften the plastic at the desired bend points. The track is superbly detailed, inside and out, and looks fantastic when weathered with a wash of diluted paint.

The figures provided in the kit are disappointing in my opinion, as neither are complete figures. First, there is a multi-piece Commander, dressed in winter overcoat and leather tanker's helmet. The arms of this figure are separate, and an alternate right arm is provided so that the figure can be positioned holding the open hatch or grasping a signal flag staff. The disappointing part of this figure is that his legs are amputated below the knee for some reason. A second half-figure is provided for the tank's driver. However, this figure is complete only from the waist up and he must be positioned on top of a box. It thus becomes impossible for these figures to be used outside of the tank.

Irregardless of the comments made above, this is an extremely well done kit. It goes together well and is an accurate representation of a vehicle almost ignored by other companies. The amount of exterior detail will please practically all modelers and, with some extra work, the kit can be completed on the interior. I feel that this is one of Tamiya's best kits to date....

E.S.C.I.'s **German Hanomag Sd.Kfz.251/1 Armored Halftrack**, **Marder III. German Tank Destroyer**, and **German 150mm 'Hummel' Self-Propelled Howitzer**, all in 1:72nd Scale.

Reviewed by James Steuard

The three models reviewed here are new E.S.C.I. releases in 1:72nd scale. E.S.C.I., up to this time, has been better known for their large scale motorcycle kits, and these 1:72nd scale kits are a new venture for this company. The three models which we are reviewing here are part of a multiple release of some 12 kits. All three kits have been molded in a blue-gray plastic which closely resembles the early-war German paint. The amount of flash varies considerably from kit to kit; the **Hanomag** kit was the worst in this respect and care must be taken in trimming the flash from small parts. Instructions in these kits are largely visual, with written text being confined to the front data page. No difficulties were encountered in following the assembly instructions. The decals provided in the kits are a little thick, but can be used if trimmed carefully to use only the flat portions of the decal sheets. Each decal sheet provides for three or four schemes, and most appear to have been prepared from photographs of the original vehicles.

The model of the **Hanomag Sd.Kfz.251/1** depicts a riveted-hull **Ausführung C** mid-war version. The kit scales out on the small size and builds into an acceptable model, provided that care is taken with the small parts. The kit contains 61 pieces. One minor error is evident in that the steering wheel

Continued on Next Page



does not have the reversed slant typical of this vehicle series. In addition, rivet detail is too large in size (like 2-inches in diameter), but it is difficult to avoid this in the smaller scales. There are two figures provided in the kit; a standing helmeted officer with binoculars, and a standing machine gunner. When posed inside of the model, they are effective, however, the interior still looks pretty bare when you consider that a normal crew consisted of eight or more.

The model of the **Marder III**, tank hunter depicts an early **Ausführung H** vehicle. Where the **Hanomag** detail was a little coarse, the amount of surface detailing on the Marder is superb! There are 70 parts in the kit, some of which are tiny to say the least. The kit includes two standing figures; one officer with peaked hat and one enlisted man. Their arms are cast separately, allowing some animation. Three empty shell cases are provided, along with one separate complete round and others in ammunition racks. This is an especially well done kit which nicely duplicates the original.

The third kit is a rendition of the **German 'Hummel' Self-Propelled Howitzer**, the principal heavy artillery piece of the Panzer-Divisions. The kit depicts the early version of this vehicle. The model has 45 parts and detailing is well executed. There are two seats cast into the upper hull (part 45) which are incorrect and care must be taken when assembling the two halves of the howitzer in order to minimize the seams that will have to be removed. The end product looks most realistic and this model would be a good starting point in 1:72nd scale.

E.S.C.I. deserves congratulations for making such nicely detailed models in this small size. In many ways, this scale is forced to compete with earlier models in 1:76th scale, and this might hinder their sales. We hope not, as they are excellent models on their own. Our review samples were provided by International Hobby Supply who have the entire E.S.C.I. line in stock and available.

#### Tamiya's U.S. Army M-10 Tank Destroyer in 1:35th Scale...

Reviewed by Duane Thomas

The M-10 Tank Destroyer represented America's answer to the German Panzer III. and IV. tanks which invaded France in the summer of 1940. Armed with an adaption of a 3-inch naval rifle, the vehicle was based on the newly developed 'Sherman' tank chassis. Instead of the familiar angular hull of the Sherman, the M-10 had a highly sloped hull which was largely constructed of welded flat plates. The hull offered fair protection to enemy fire; however, the open-topped turret hindered employment in close combat or built-up areas. The success of the M-10 depended greatly upon good firing positions and ambush techniques.

Tamiya's new model of the M-10 is an excellent replica of the original vehicle. It depicts a late-war version of the M-10, complete with angular counterweights at the rear of the turret; however, since the counterweights are separate, it wouldn't be too much trouble to create an early version, sans weights. The hull is not as well molded as might be expected from this company. The armor 'texture' is somewhat coarse, the hull hatches are not separate pieces (and opening them would be difficult), and tools on the hull rear are not separate pieces, nor are they well molded. In fact, they can best be described as 'bas relief'. They definitely need replacement by separate tools. Much of the hull detailing is 'add-on', and this helps to make the vehicle hull look better than the basic molding indicates. The tracks and suspension are equal to Tamiya's best efforts. Tracks are of the late-war chevron pattern. The track join is well executed for strength, but it was a little difficult to assemble on our example and it would be a good idea to hide the completed joins under the vehicles fenders.

The 76mm gun and turret are very nicely molded with turret interior, which, if not totally complete, goes a long way towards total authenticity. With a little reference from the vehicle manual, it's possible to superdetail the turret quite

easily. Tamiya supplies a number of packs and bedrolls for exterior realism, and the .50 caliber anti-aircraft machine gun is far better than this company's early efforts. Its now four separate pieces with a separate ammunition box. With a little care, it's possible to drill out the barrel (with a #79 drill to keep in scale).

No figures have been provided with this kit, and to make a complete diorama, it will be necessary to use figures from Tamiya's M-36, from the Tank Crew Set, or from another U.S. armored vehicle model.

The decal sheet includes markings for three different M-10's from the 601st TD Battalion, the 701st TD Battalion and the 704th TD Battalion. All decal lettering is clean and well defined and the sheet is coded to indicate the correct placement of the white stars.

This is a well thought-out and executed kit, and it can be recommended to those readers interested in modeling U.S. vehicles in 1:35th scale. It is especially nice that, with a number of minor conversions, it's now possible to make models showing the complete evolution of U.S. tank destroyer weapons....

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#### Peerless/Max's U.S. Army Dodge WC-62 1½-ton Personnel Carrier Truck in 1:35th Scale.

Reviewed by James Steuard

The WC-62 1½-ton truck was Dodge's response to a military requirement for a vehicle which could carry a full infantry rifle squad and its equipment. Basically, the WC-62 was a 'stretched' ¾-ton Dodge WC-52 Weapons Carrier; the stretching process lengthening the frame and body and another pair of wheels being added, along with the associated drive train, to permit 6-wheel power. The resulting vehicle used many of the ¾-ton truck components and was widely used as a troop transport. While not as well known as the GMC 2½-ton CCKW, it was a significant vehicle in the U.S. Army.

Peerless/Max's model of the Dodge 1½-ton truck is a well engineered kit which makes up into an accurate representation of the vehicle. The kit includes the basic vehicle, which may be modified by the installation of a .50 caliber machine gun and ring mount, and a ¾-ton trailer. The model can be built as a WC-62 (without winch) or a WC-63 (with winch). The canvas covering the troop seat area can be installed rolled-up on the sides, or left off to illustrate a cargo carrying vehicle. The ¾-ton trailer does not include a canvas top or top bows.

This kit is one of the most highly detailed 1:35th scale models this reviewer has built. All details are accurate per photographs in the U.S. Army technical manual for the vehicle. The underbody of the truck is complete with drive shafts, universals, transfer cases, springs, axles, etc... all that clutter that characterizes U.S. wheeled vehicles. The .50 caliber machine gun and its ring mount, the pioneer tool set (on the truck tailgate) and the spare tire carrier are extra nice accessories which add a good deal of realism. The decal sheet contains markings for three different trucks and one version of the trailer. One set of truck markings depicts a postwar vehicle in Japan, while a second covers a vehicle of the 25th Infantry Division circa 1955. If you are interested in modeling a vehicle used in Europe during the war, you'll have to work up markings from another decal source.

The only area in the kit in which I could find some fault is in terms of the figures which are provided in the kit. There are four of these... three G.I.'s and a child. I suppose the child is meant to depict a mascot? At any rate, he's wearing an oversize civilian suit coat and combat boots. I'm of mixed opinions regarding the three G.I.'s. Their helmets don't quite duplicate the shape of the originals, and the poses seem too artificial. In spite of these complaints, the kit is a welcome addition to the 'softskins' already available - its a thoroughly enjoyable kit to build and I can immediately think of several conversion possibilities... such as adding a winterized cab and canvas top, and a top for the trailer. Incidentally, this trailer could also be used with the Peerless/Max ¾-ton trucks,



# AFV-G2 REPORTS ON THE MODELING SURVEY

In AFV-G2, Volume 4, Number 11, we presented a modeling survey from Japan, along with the results of those surveys circulated in Japan. In the introduction to the survey, we solicited completed 'xerox' surveys from our readers. What you are now reading is the long overdue report on the completed surveys we have received to date. The tabulated data below is being forwarded to Japan, and also to manufacturers and their representatives in the United States.

To date, we have received slightly over 300 completed survey forms... this total represents about 6% of our readers, and while not, perhaps, expressive of the entire readership, it does represent the opinions of serious armor modelers, judging by the numerous margin comments on the completed surveys. Several interesting facts became evident as we scored the survey results and the margin comments.

First of all, a fair number of those surveyed didn't fully read the directions. We asked for a deliberate number of responses in each survey area, in order to determine a ranking order. In some cases, those readers surveyed marked all **six** or **seven** choices for models they'd like to see! In these cases, we had to ignore their responses, since they would not contribute fairly to our 'ranking' order of interest. Several of those surveyed chose to ignore certain areas of the survey entirely, and thus, each category has had to be evaluated in terms of the percentage of votes in that category. In a few cases, readers sent in long supplemental lists under 'Others (List Below)', and these lists were far beyond the scope of the survey to tabulate, both in quantity of votes and types of vehicles. Still, we have listed 'Others' when they acquired a fair number of votes. Let's look at the readers responses to the survey...

## Category #1 - United States Wheeled Vehicles...

1st M3A1 Scout Car	40%
2nd Dodge ¾-ton Truck	21%
3rd Dodge ¾-ton Ambulance	19%
4th M8 Armored Car	12%
5th DUKW Amphibian Truck	9%
Others: GMC 2½-ton Truck	3%
Dodge 1½-ton Truck	1%

## Category #2 - United States Combat Vehicles:

1st M24 Chaffee Light Tank	21%
2nd M4 Sherman 'Firefly' Tank	18%
3rd M4A1 - M4A2 Sherman Tank	14%
4th M3 Halftrack Personnel Carrier	11%
4th M3 Stuart Light Tank	11%
5th M4A3 Sherman Tank	6%
Others: M7 'Priest' Howitzer Motor Carriage	4%
M10 Tank Destroyer	3%

## Category #3 - British Wheeled Vehicles:

1st Marmon-Herrington Armored Car	29%
2nd Humber Scout Car	20.9%
3rd Daimler Scout Car	15%
4th Humber Utility Truck	9.3%
5th Austin Ambulance	5.8%
6th Matador Gun Tractor	4.6%
6th Rolls-Royce Armored Car	4.6%

## Category #4 - British Combat Vehicles:

1st Universal Carrier	32.2%
2nd Crusader Tank	20.4%
3rd Valentine Infantry Tank	15.0%
4th Cromwell Tank	12.9%
5th Cruiser Tank Mark II.	9.6%
Others: Churchill Infantry Tank	3.2%
Mark VI. Light Tank	2.4%

## Category #5 - Soviet Union Wheeled Vehicles:

1st BA-10 Armored Car	40%
2nd GAZ Truck with Rocket Launcher	30.7%
3rd Studebaker Truck with Rocket Launcher	24.6%
Others: BTR-60 Armored Personnel Carrier	2.2%

## Category #6 - Soviet Union Combat Vehicles:

1st BT-7 Fast Tank	21.5%
2nd T34/76 Medium Tank	17.6%
3rd JS-I Heavy Tank	12.7%
4th SU-76 Assault Gun	10.7%
5th JSU-152 Assault Gun	7.8%
6th Komsomlets Tractor	6.8%
7th T34/85 Medium Tank	5.8%
8th SU-122 Assault Gun	3.9%

## Category #7 - German Wheeled Vehicles:

1st Opel 'Blitz' 3-ton Truck	24.1%
2nd Kfz.69 Krupp Protze 6x4 Truck	23%
3rd Kfz.15 Horch Staff Car	18.6%
4th Kfz.18 Heavy Einheits-PKW	17.6%
5th Kfz.3 Light Car	10.9%
6th Volkswagen Kübelwagen Light Car	2.1%

## Category #8 - German Unarmored Halftracks:

1st 1-ton with 2cm Flak 38	34.0%
2nd 1-ton with 5cm Pak 38	24.7%
3rd Opel 'Maultier' Halftrack	12.3%
4th 3-ton Halftrack	11.3%
4th 5-ton Halftrack	11.3%
5th SWS Halftrack	5.1%

## Category #9 - German Armored Cars & Halftracks:

1st Sd.Kfz.223 Light Armored Car	24.7%
2nd Sd.Kfz.250/8 Light Halftrack w/ 7.5cm Gun	16.5%
3rd Sd.Kfz.234/3 'Puma' Armored Car	15.4%
4th Sd.Kfz.251, Ausf.D Armored Halftrack	13.4%
5th Raupenschlepper Ost Tractor	10.3%
6th Sd.Kfz.250/3 Light Signal Halftrack	8.2%

## Category #10 - German Armored Vehicles:

1st Panzerkampfwagen Ib. Light Tank	27.9%
2nd Panzerjäger Ib. Light Tank Destroyer	15.4%
3rd Marder II. Tank Destroyer	10.5%
3rd 'Wespe' Armored Artillery Vehicle	10.4%
4th 'Nashorn' Heavy Tank Destroyer	6.3%
5th Marder III. Late Type Tank Destroyer	5.6%
6th 'Hummel' Heavy Artillery Vehicle	4.9%
6th 'Elefant' Heavy Tank Destroyer	4.9%

## Category #11 - French, Italian & Japanese Vehicles:

1st French Char B1 Heavy Tank	20.3%
2nd French Souma S35 Light Tank	15.9%
3rd Italian Autoblinda 40 Armored Car	13.7%
4th French Hotchkiss H35/39 Light Tank	7.9%
4th Japanese Type 97 Medium Tank	7.9%
5th French Renault R35 Light Tank	6.5%
5th French Panhard 178 Armored Car	6.5%
6th French Renault FT Light Tank	5.8%
7th Japanese Type 95 Light Tank	5.0%
8th Italian Fiat SPA TL37	4.3%

## Category #12 - Guns of All Nations...:

1st Russian 76mm Anti-tank Gun	17.5%
2nd German 10.5cm Field Howitzer	12.2%
3rd German 'Nebelwerfer' Rocket Launcher	9.9%
4th German 5cm Pak 38 Anti-tank Gun	5.8%
4th British 17-Pdr. Anti-tank Gun	5.8%
5th German 3.7cm Flak 36 Anti-aircraft Gun	5.2%

Continued on Page 41

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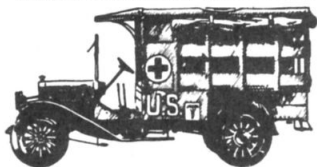
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Color 'n Camouflage: German *Panzer II.*'s (Continued from Page 24).

On the front, rear, and both sides of the tank appeared the 7. *Panzer-Division* tactical insignia. This consisted of a 4-inch high yellow 'Y'. On the front of the tank, this insignia appeared to the left of the driver's visor, while the rear marking was applied to the back of the turret next to the National Marking. On the sides of the vehicle, the divisional insignia was painted just above the second track return roller.

German National Insignia on this *Panzer II.* appeared on the rear of the turret, as already mentioned, and also on the hull sides immediately forward of the divisional insignia. Note that these insignia were approximately 10-inches square, with narrow white outlines. Further identification was provided by a German flag, which was tied to the rear decking of the tank as shown.

(Note: In the above chart, an asterik (\*) indicates a number which has not been verified directly by photograph.)

The Baron's Bookshelf (Continued from Page 13).

& Reconnaissance Vehicles, 3) Mechanized Infantry Combat Vehicles (APC's), 5) Bridgelayers, and 6) Armored Recovery Vehicles. There is a brief index listing the contents by designation only. Within each category or section, vehicles are listed by country in alphabetical order. There are no breaks between sections, making it a little difficult to quickly find a vehicle by thumbing through the pages. Each vehicle in the book is given two pages of coverage (or less); one page contains a large, good-quality photograph, while the facing page provides data, notes and a status report. The sections on bridgelayers and recovery vehicles consist entirely of photos, with titles displayed beneath the pictures.

The primary value of this book is obviously in terms of its photographs. Mainly, these are full page in size and have been picked for their clarity and detail. Many of them are unusual and illustrate the chosen vehicles nicely; for example, there are excellent photos of the Chinese *T-59* (an Indian example), the French *AMX-30*, the Japanese *STB* and the West German *Marder* APC. A number of the photos, though have been enlarged from small, coarse-screened newspaper photos, and thus suffer from poor reproduction. In some cases, the photos are so poor as to make one wonder why they were used. Since the editor is listed as an 'authority' on modern vehicles, it would seem logical that he could have found better photos than these!

The editor, in his introduction, states that the objective of the book is to enable the reader to *quickly* identify *any* modern vehicle. In this reviewer's opinion, the book fails to meet this objective, even minimally. First of all, no basic description is provided for any vehicle. By this, we mean something like the following, for example: 'Turret centrally mounted with external roof machine gun and square infra-red/visual light searchlight; main gun has center-position, eccentric bore evacuator and no muzzle brake; chassis has live track running over two small return rollers and under seven medium-sized, solid road wheels; drive sprocket is at the rear...'. This type of written description is valuable in identification since it provides a checklist for a reader to follow. There is plenty of room on every text page in the book for this type of description. Secondly, while the large photos are nice, there should be more than one photo for each vehicle. This reviewer would opt for two or three smaller photos, rather than one large one, to facilitate identification. It is far easier to identify a vehicle when you have a number of different views of it. As a third factor, many vehicles are not covered except as brief variant notes. For example, what can a reader find in the book on such vehicles as the M728 Engineer Vehicle, the M557A1 Command Vehicle or the AMX-30DCA Anti-aircraft Tank. The answer... literally nothing!

In conclusion, this book is worth adding to your library in terms of the crisp, clear photos. The data is useful, but as an identification manual which covers *all* modern AFV's, it fails to meet our standards. It's pretty expensive for a pure picture book when you consider other available publications on the market.

When Tanks were 'Combat Cars'... (Continued from Page 21).

U.S. armor in existence in 1940. However, this situation was soon to be rectified.

In April of 1940, large scale maneuvers were held along the Sabine River in Louisiana. Five of the ten Regular Army divisions participated, as well as a large number of Corps and Army troops. Among the latter were the 7th Cavalry Brigade and the Provisional Tank Brigade, composed of three Infantry Tank Regiments stationed at Fort Benning. These two units were joined into an improvised 'Armored Division', and as such, dominated the maneuvers to such an extent that within three months, a separate 'Armored Force' (with two Armored Divisions and a G.H.Q. Tank Battalion) was created. Of the component units, the 1st Armored Division was more-or-less a 'Cavalry show'. On July 15th, 1940, both the 1st Cavalry and 13th Cavalry were officially redesignated as Armored Regiments and they joined the newly created 'Armored Force'. Thus, they lost, for a time at least, their cavalry identity, but they took with them their experience and spirit, as well as their M1 Combat Cars - now officially known as M2A1 Light Tanks....

## 'Muzzle Blast' (Continued from Page 4)

Cavalry Troop, and the exchange of information it prompted in the 'Muzzle Blast' columns. I served in this type of unit in the late 1950's and it is always interesting to see the changes that time (and progress) brings about. In my day, we were transitioning from the M41 Light Tank to the M48A1 Medium Tank in the troop's Tank Section, and the Infantry Squad rode in an M59 APC. Scouts had the benefit (?) of an open jeep mounting a Browning .30 caliber machine gun. So much for progress...

Seriously, I'd like to make a couple of requests. First, please continue your coverage of modern-day U.S. Army units. I don't know how many readers are interested in modern armor, but I feel it is important to illustrate current units in order to picture change and growth within a country's armored force. Secondly, I'd like to see coverage being given to current military vehicles; in other words, let's have some material on today's news-makers: the TOW missile launcher and the M60A2 Medium Tank, for example.

In spite of my requests, your magazine is the best of its kind that I've seen. I especially appreciate the quality of your photographs and drawings.

Sincerely,

Bill Lewis  
San Bernardino, Calif.

## AFV-G2 Reports on the Modeling Survey

### (Continued from Page 38)

5th	German 15cm Field Howitzer	5.2%
6th	German 2cm Flak 38 AA Gun	4.8%
7th	Russian 14.5mm AT Rifle	4.5%
Category #13 - Military Campaigns:		
1st	Russian Campaign, 1941-44	
2nd	North Africa, 1940-43	
3rd	European Theater, 1944-45	
4th	Italy & Balkans Campaign, 1943-45	
5th	French Campaign, 1940	
6th	Pacific Theater, 1942-45	
6th	Berlin Campaign, 1945	
Category #14 - Figures:		
1st	Italian Infantry	13.0%
2nd	German Waffen-SS	10.6%
3rd	Japanese Infantry	8.8%
4th	Male Civilians	8.3%
5th	Female Civilians	7.7%
6th	German Army Infantry	6.5%
6th	German Tank Crews	6.5%
6th	U.S. Paratroopers	6.5%
6th	French Infantry	6.5%
7th	U.S. Tank Crews	5.2%

## Mechanized Rifle Company (Continued).

M113 for employment in a defensive perimeter, and it offers a significant advantage over the earlier 106mm recoilless rifle. In a future issue, we will present an article which describes these missile systems in greater detail; suffice it to be said here that they add a great deal to the effectiveness of the Rifle Company.

From

## Game Designers' Workshop

**Drang Nach Osten!** is an historical, division-level simulation of the German invasion of Russia in World War II. Starting in June, 1941, the game covers the *Blitzkrieg* phase of the campaign through March, 1942, when the spring thaw halted the Soviet winter counteroffensive. *Drang Nach Osten!* includes five 21x27" maps, over 1700 die-cut counters in five colors, and extensive rules and charts covering the special capabilities of different unit types, including the effects of massed armor and antitank. The unique air system allows both playability and extensive differentiation between aircraft models on the group (50 aircraft) level. \$13.75 + \$1.00 postage.

**Unentschieden!** (Stalemate) is the companion game to *Drang Nach Osten!*, carrying the game through 1945. 1800 additional counters, four half-mapsheets, and supplementary rules covering the changing nature of the war on the Eastern Front. \$12.85 + \$1.00 postage.



DRANG NACH OSTEN/UNENTSCHIEDEN: Soviet offensive around Rostov, fall 1943

*Drang Nach Osten!* and *Unentschieden!* are the first in the **Europa Series** of games to cover the European Theater of World War II with interchangeable units, compatible maps and consistent rules. Also available: *Narvik* (the campaign in Norway) — \$8.75. In preparation: *Their Finest Hour* (the Battle of Britain/Operation Sea Lion), and *Merita/Merkur* (the Balkans campaign).

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## Game Designers' Workshop

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**Triplanetary** is a game/simulation of interplanetary conflict in the 21st Century. A system of vector movement reproduces Newtonian mechanics while retaining simplicity. Combat, using guns, torpedoes mines and ramming, disables ships so they may not maneuver. Game play is by scenario, covering situations from simple race to alien invasion. *Triplanetary* comes complete (no IBM 360 necessary) with hex map of the inner solar system, die-cut counters in four colors, and rule booklet. \$6.80 postpaid (shipped rolled).



CHACO: Results of a Bolivian attack, early 1933

**Chaco** is a game/simulation of the Chaco War, Bolivia vs Paraguay, 1932-1935. The Chaco War was a classic infantry campaign, touched, but not tainted by the technological developments of the period. Tankettes, aircraft, gunboats never tempered the overwhelming infantry flavor of this war. *Chaco*: 22x28" two-color map, 380 die-cut counters, extensive rules and charts. Special features include variable division and corps composition, strategic options, transportation and pre-war incident scenarios. \$6.80 postpaid.

**Eagles** is a strategic-level game of Rome on the Rhine frontier, AD 15. An earlier campaign had resulted in the destruction of three Imperial Legions and the loss of their sacred Eagles. The Emperor and his greatest general, Drusus Germanicus, resolved to recover the Eagles and avenge the Empire. Although losses run high, victory is determined by recovery of the Eagles. Special rules provide for step-reduction of Legions, Drusus, Arminius and the German chiefs, and German tribal mobilization. \$6.80 postpaid.



# You're in command.



Realistic diorama of Monogram's 1/32 scale Sherman M4 Hedge Hog tank. Kit #4201



Monogram's 1/32 scale Sherman M4A1 Screamin' Mimi tank in realistic diorama. Kit #4200



One of the many realistic situations you can create with Monogram's 1/32 scale Panzerspähwagen tank. Kit #7581

Monogram armor tanks are history in the making. And you call the shots. Place your 1/32 scale kits in realistic dioramas to re-create the smallest detail that actually happened . . . or rewrite history the way you see it.

Monogram gives you all you need: movable guns; revolving turrets; bogie wheels; flexible tracks; uniformed crewmen; authentic decals; and lots of extras. Add your own imagination and model building skills and the end result is an armor collection you'll be proud to call your own.

And Monogram gives you something extra to add excitement and enjoyment to your models. Each tank kit contains full color 4 page folders completely illustrated with color photos and detailed suggestions for building dioramas. These diorama sheets are professionally written and helpful to beginners and advanced modelers alike. The sheets include tips on "weathering," rusting and battle damaging your tanks, mounting them in appropriate settings and adding extra touches of realism for your armor displays.

There are over 20 kits to choose from in Monogram's armor collection. Whether you select a kit from our German WW II series like the Sturmpanzer, Ostwind Flakpanzer, Panzerspähwagen or the Screamin' Mimi, Sherman Hedge Hog, U.S. Patton from our American tank series . . . you'll get the most authentic and exciting armor kits available.

So if you take your model building hobby seriously . . . take command with Monogram's armor collection. About \$4.00 per kit wherever model kits are sold.



**MONOGRAM MODELS, INC.**  
MORTON GROVE, ILL. 60053

*For full color catalog of complete line of  
Monogram model kits, send \$1.00 to Dept.181*

## with our Armored Division.